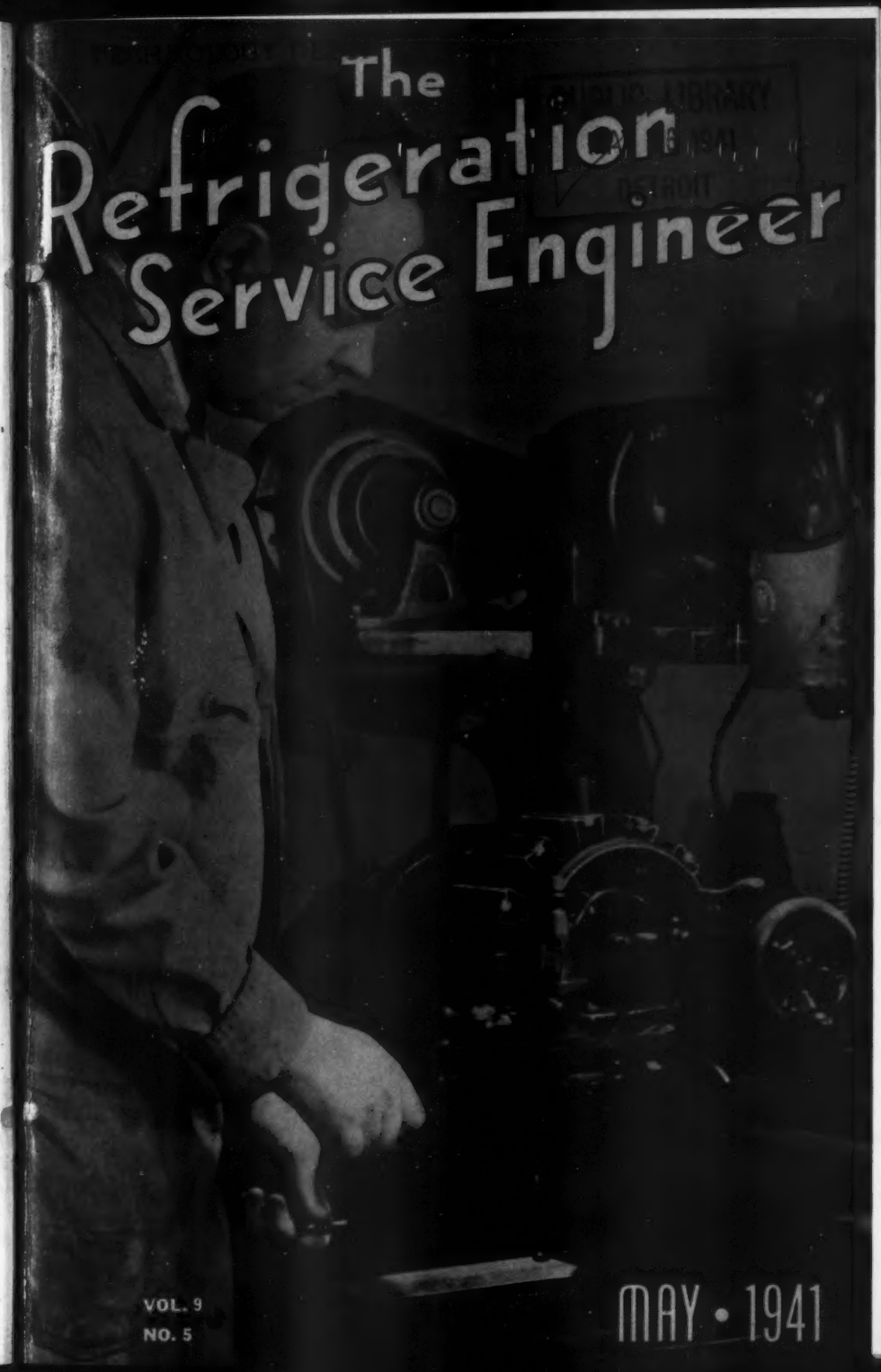
The Refrigeration Service Engineer



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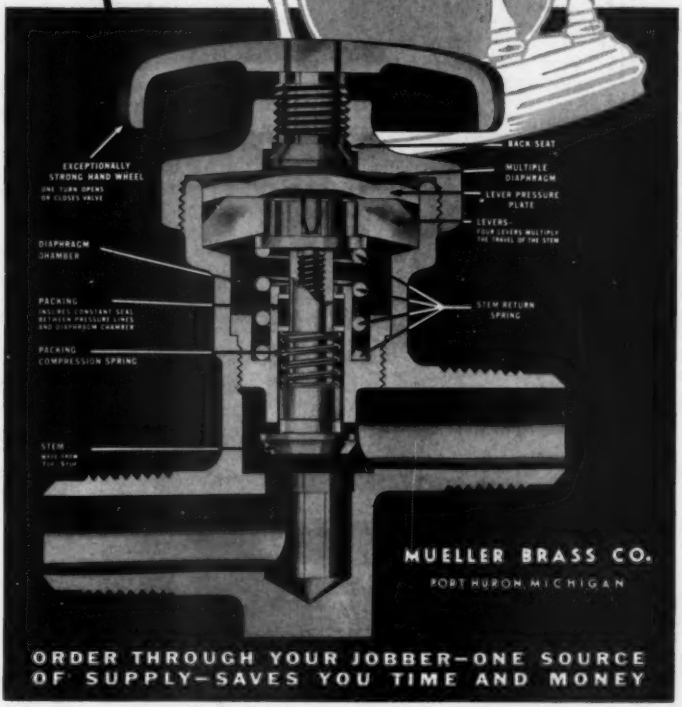

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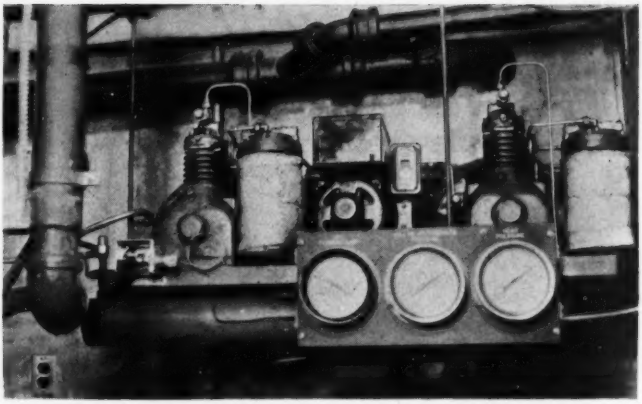

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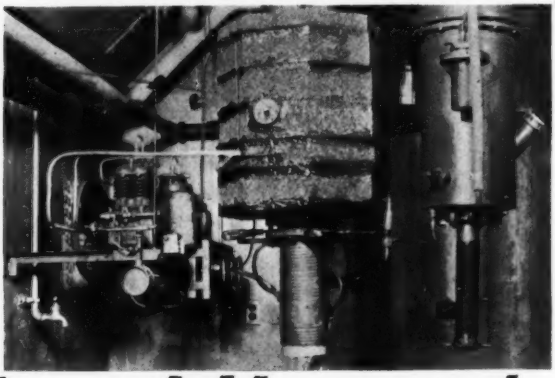

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The Refrigeration Service Engineer

Vol. 9 No. 5

May, 1941

A Monthly Illustrated Journal Devoted to the Interests of the Refrigeration Service Engineer in the Servicing of Domestic and Small Commercial Refrigeration Systems and Oil Burners

Official Organ
REFRIGERATION SERVICE ENGINEERS SOCIETY

COVER

The weld of a Frigidaire Meter Miser unit being machined off in a 9 inch bench lathe before opening the unit for repairs.

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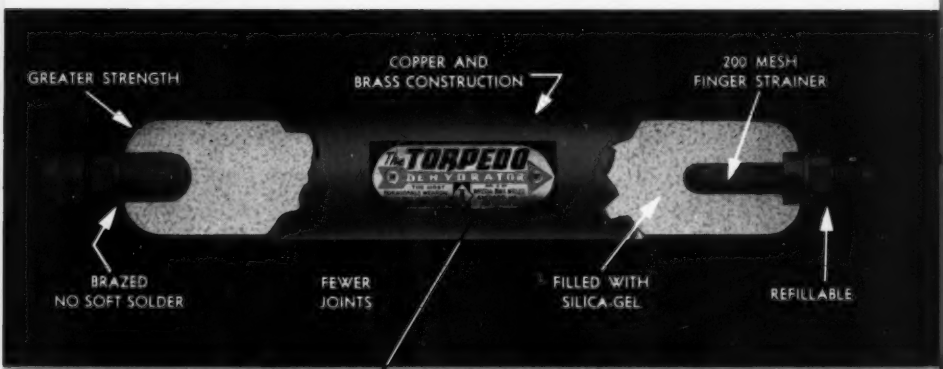

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The Refrigeration Service Engineer

Vol. 9, No. 5 CHICAGO, MAY, 1941 $2.00 Per Annum

Metal Finishing

The Refrigeration Industry again borrows from the Automotive Industry. This time it is in the art of finishing metal surfaces, a process known as Superfinish.

By W. J. AULSEBROOK *

IF we were to go back far enough into the history of mechanical devices (and we need only go back to the days of our great-grandfathers) we would find many objects made of wood which are now universally made of steel and other metals. The axles of wagons, spindles, pulleys, and even gears of the old grist mills were of wood painfully carved and scraped to the proper size and shape.

Gradually, however, this construction was supplanted by metal, principally cast iron, and in the beginning the roughness of this material as it came from the molds was corrected by filing or "breaking in" by allowing one part to wear on another. Soap, tallow and other crude lubricants were used on this type of bearing to minimize friction. Blacksmiths and the early metallurgists gradually developed malleable iron and soft steels which could be forged into the smoother and more uniform elements, and these gradually replaced the cast iron parts.

Lathes in which a metal shaft was revolved in contact with a sharp cutting tool marked an important forward step in producing spindles, shaft, and other elements which were more nearly round and smooth than castings or forgings. Wagons pulled easier and mills ran more smoothly on these improved bearings.

The turning lathe, however, has certain serious shortcomings in producing a good bearing surface. First, its action is in reality a digging or chipping operation which breaks the crystals of steel out in bits and leaves pits, or a series of threadlike grooves. The flatter the finishing tool and the finer the final cut, the less pronounced are these effects, but the best-turned spindle still presents a relatively rough surface, which will scour and gouge the softer surface of bearing metals and will wear at a relatively fast rate.

During the past 50 years, metallurgists have made tremendous strides in developing hundreds of varieties of steels by alloying pure iron with suitable quantities of nickel, vanadium, chromium, tungsten, molybdenum and the carbon which is present to a greater or lesser degree in all steel. The trend thru all of this time has been toward harder, stronger and tougher materials. During the past decade, particular stress has been laid on steel for mechanical

* Servel Inc., Evansville, Ind.

devices having a strong, tough interior core but with a surface which has been especially hardened to resist wear.

When used as a bearing, in gears, etc., a degree of hardness was rather quickly reached in which it was no longer possible to shape the material by means of steel or even alloy tools in a lathe and for this purpose the practice of grinding was introduced. In a simple form, to finish, say a straight shaft, with a hardened steel surface, the shaft is centered in a lathe and while it is revolved at a relatively slow speed, a high-speed abrasive grinding wheel is brought in contact with the shaft. These grinding wheels are in effect a conglomerate of fine or coarse abrasive particles (carborundum compounds usually) cemented together under heat and pressure. The cutting action is actually a very rapid series of chipping operations by the individual crystalline particles coming in contact with the steel.

This procedure does not cut a uniform "thread" from end to end of the material as is the case with the lathe, it does, nevertheless, leave a definite jagged or saw-tooth surface due to this chipping action. The finer the grinding wheel, of course, the smaller the "scratches" but it is never possible to eliminate all of the scratches and a second very peculiar phenomenon is associated with all grinding.

Smear Metal

When a high-speed grinding wheel is run in contact with hardened steel, even though it is flooded with water or other fluid lubricant, there is a minute line of contact in which the abrasive action of the wheel heats the surface of the metal. This action decarburizes or "draws the temper" on the surface with the result that a metal layer which was originally very hard and wear-resistant becomes coated over with a film of softened metal in the form of more or less irregular flakes pressed down into the irregularities caused by the grinding wheel. Peculiarly enough, it is the spreading of this smear metal which gives ground surfaces their brilliant lustre. In a sense, it is like wrapping a layer of foil around an otherwise roughened and irregular surface. Unfortunately, however, this softened surface and the irregular contour of the crystalline structure beneath it do not constitute a really satisfactory bearing surface. A shaft bearing, theoretically, is in contact with the shaft itself from end to end, and the weight or other load carried by the shaft is distributed uniformly throughout the length of the bearing. Unfortunately, however, a shaft which has simply been ground does not have its basic crystalline structure in contact with the bearing at all, but rather is separated from it by a layer of smear metal, and under this an irregular pattern of ridges and valleys which have been torn out by the grinding action. It is because of this that practically every machine shop in the past has made a practice of fitting bearings "on the tight side" knowing that after a few weeks or months of wear these shafts "break in" and fit in the bearings more loosely.

What was overlooked was the fact that in this "break-in" process the smear metal and the sharp ridges which had to be broken off on the surface of the shaft became scraped off and thereafter circulated with the lubricant, to the detriment of all parts of the system, to say nothing of the fact that the softer member of the bearing was scoured and loaded with abrasive particles. Automotive engineers came squarely up against this problem when they discovered that roller bearings in automobile wheels, when shipped via freight train or boat to distant points where a vibrating weight was carried by one or two rollers on one spot in the race, the surface of the race was indented and thereafter developed serious pits and roughness. To correct this situation they found that all they had to do was to remove this soft coating of smear metal and cut down the hills and ridges left by the grinder so that the bearing surface in the beginning was a smooth, flat area of steel having the same basic hardness as the original piece before machining. Scores of schemes were tried to accomplish this final minute smoothing operation.

Burnishing

The process of forcing rollers against the surface of a revolving machined shaft has been used for years to create an apparently smooth surface, but photomicrographs and tests prove that this procedure merely masks the difficulty by smashing down the ridges and creating even more soft smear metal to be sloughed off.

Variations of the burnishing technique employ balls or rollers, which are beaten against the metal by cams, resulting in a hammering or kneading action, and while

these processes do produce a bright surface, that appears to be smooth, it really doesn't correct the irregularities but simply hides them.

Lapping

A third smoothing process, called "Lapping," consists of loading a fibrous belt with fine abrasive, such as powdered emery or pumice and running this belt against the revolving shaft at fairly high surface speeds. This process likewise produces a surface of high lustre but fails to correct many surface irregularities, because the flexible abrasive carrier tends to follow the contours of the original surface. Lapping of flat surfaces such as seal members is effective because the abrasive is loaded into a solid, flat plate, and so does cut on the high spots and produces a satisfactory finish.

Superfinish

The automotive engineers finally discovered through the process of elimination that a new technique was necessary. Their first long step was in discovering the weakness of previous methods, namely, the presence of surface ridges and valleys and the coat of soft "smear metal" which was spread over the hard crystalline steel surface. The "smear metal" could be "rubbed off" by any one of several methods but the ridges, being comparatively hard, must be cut with a sharp abrasive and controlled so that the surface would be a true cylinder without flat spots or taper. They knew, furthermore, that the surface speeds of this final operation must be low enough to eliminate any possibility of heating at the point of contact, which would create more "smear metal."

After numerous experiments these engineers hit upon the idea of using a stick or bar of abrasive material, like a whetstone, having a true straight surface mounted in a resilient holder so that the face could adjust its alignment to the surface being finished. They found that by revolving the work at low speeds (50 to 250 rpm) and at the same time oscillating the stone from side to side, the desired results were obtained. They found that two such stones, separated by about one-fourth of the circumference of the work, were more effective than one stone, and that the quality of the finished surface was materially affected by the pressure on the stones and the surface speed of the work. Their final method, which proved most effective, consists in running the work at very low surface speed at the start, using fairly heavy pressure on the stones, then finishing at a relatively higher speed and very light cutting pressure.

Each type of material handled calls for a different texture of stone, the differences being both in hardness, and the fineness of the "grit."

The automotive engineers found, moreover, that successful superfinishing demanded a high degree of precision in preceding operations. Superfinishing would not correct flat spots, pits, or tapers caused by poor grinding operations. It would not work unless the carburizing and other heat treating operations were properly controlled before the grinding operation. Superfinishing cuts away only the surface defects and cannot be expected to correct size errors of previous operations.

The advantages of Superfinish were so obvious that automobile and airplane manufacturers took it up promptly for all shafts, spindles, and other cylindrical parts in vital locations. Engineers and shop men suddenly found it necessary to revise completely their ideas about accuracy in measurement. Where they had previously regarded a "tenth" of a thousandth of an inch as the ultimate measure of accuracy, they were suddenly confronted with surfaces in which the maximum irregularities were measurable only in *millionths* of an inch. "Smooth as glass" took on a reverse meaning, for a good job of Superfinishing is much smoother than any glass except those pieces which have been especially polished for precise optical instruments.

Jess A. Belmont
California.

I would like to subscribe to your magazine called THE REFRIGERATION SERVICE ENGINEER. I am a service man in that field and I happened to get hold of your February issue. I think that your Question and Answer column is well worth the money alone. They are simple and right to the point on every day occurrences in that field.

Joseph Olkowski
Pennsylvania.

Enclosed you will find money order for which please send me your Head-Back Pressure Calculator. A service man's tool kit is not complete without this calculator.

Problems of Refrigerant Distribution Through Multi-Circuit Coils

(Continued from the April issue)

By A. B. SCHELLENBERG*

How to Recognize Distribution Troubles

WE have outlined the various methods of obtaining distribution to parallel circuits in the April issue, now let us investigate the symptoms of a system suffering from poor distribution.

1. *Low suction pressure—Low superheat.* If the suction pressure is too low and yet liquid is coming back to the compressor, or at least the superheat at the thermo valve remote bulb is very low, it is safe to assume that liquid is short circuiting through one or two of the parallel circuits and is throttling the thermo valve so that refrigerant is not being fed to the other circuits. Usually, in this case, any attempt to lower the superheat by opening up the thermo valve will not correct the condition, and often the conclusion is drawn that the thermo valve is too small.

2. *Wide temperature difference between circuits.* Another obvious indication of poor distribution is when some of the return bends or the individual suction outlets are much warmer than others, indicating that refrigerant is not flowing through those circuits in an adequate amount.

3. *Unstable control.* Another frequent indication of poor distribution is when the control is very unstable. Poor distribution will make the average thermostatic expansion valve cycle and hunt excessively. However, if the expansion valve is undersized, the suction pressure will not fluctuate since the valve will always be wide open.

The usual complaint on an installation suffering from poor distribution is that the job is under capacity, even though there is ample coil surface and valve capacity. Frequently, the tendency is to first install a larger expansion valve, and if that does not work, then to install a larger coil. There are many installations which have had additional coil surface added unnecessarily in order to get sufficient capacity when the real trouble was distribution.

* President, Alco Valve Co., St. Louis, Mo.

What Can Be Done to Correct Distribution Troubles

Now that we have determined that our trouble is due to faulty distribution, let us see just what can be done to improve the distribution on the coil.

1. *Careful design of distributor headers.* For the most part, the design of the distributor header is out of your hands and there is not a great deal you can do about it. If you do have occasion, however, to construct a header for parallel circuit coils, bear in mind the limitations pointed out in the description of the types of distributing devices. Make every effort to keep the several parallel circuits equal in pressure drop and loading so that your distributor will have every chance of working. In building a distributor or header, bear in mind you will be distributing a mixture of gas and liquid, and if it is to be a liquid type header, be sure that it is mounted absolutely level. Be cautious about the location of the liquid inlet with respect to the several circuit outlets. Obviously, if the inlet feeding the header from the expansion valve is directly in front of one of the circuits, and no baffles are present, the liquid refrigerant will short circuit through that circuit. If, in designing the distributing header, you have before you a clear picture of just what you are expecting that header to do, and how you expect it to do it, the chances are you will avoid mistakes which should be obvious.

2. *Careful application of the expansion valve to the distributor.* The location of the expansion valve itself has a great bearing upon the efficiency of a distributor. Where the distribution is obtained by means of a velocity, centrifugal, or orificing type of distributor, install the valve as closely as

possible to the distributor, and in such a manner that the flow will be direct and that there will be no elbows, or bends, between the valve and header. (Fig. 3). This is necessary because the distributors in this class depend upon a high velocity of the refrigerant to make them work. By applying the valve right at the distributor, you will take advantage of the high velocity jet of refrigerant leaving the valve.

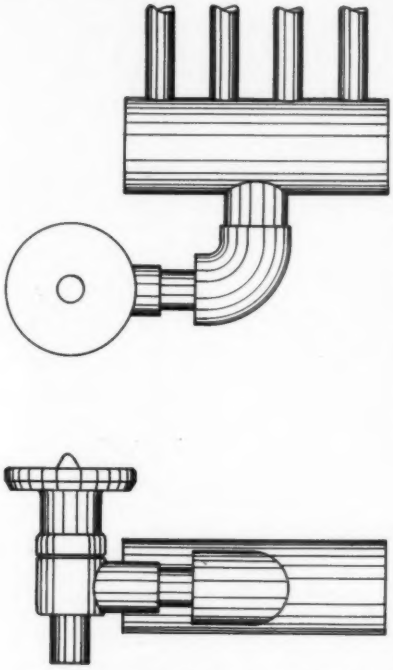


Fig. 8—Recommended method of installing Weir header

Where distribution is obtained by means of a gravity feed header or Weir header, install an elbow, a bend, or a considerable length of tubing between the valve and the header inlet so that the jet velocity of the refrigerant leaving the valve is destroyed. (Fig. 8). The distributors in this class do not require a high velocity stream of refrigerant. As a matter of fact, high velocity will destroy their distribution efficiency. This type of header works best when there is a more or less quiet head of liquid refrigerant over the various outlets. By breaking up the high velocity jet of refrigerant leaving the expansion valve, you will also minimize the possibility of refrigerant flowing through tubes directly in front of the valve outlet and the resulting short circuiting of liquid.

8. *Careful application of the thermo valve remote bulb.* Never install the remote bulb on the suction manifold as shown in Fig. 9, since it is possible for refrigerant to come through some of the circuits without ever affecting the temperature of the remote bulb. When a multi-circuit evaporator is fed by a thermostatic expansion valve, it is, of course, desirable to maintain a low superheat at the main suction outlet of the suction header. (This is generally the point of remote bulb application). To do this, theoretically, the superheated vapor of the warmer circuits should vaporize the refrigerant flooding over in the colder circuits. While this does occur to some extent, actually the lower heat content of the gas, as compared to the liquid, requires a very highly superheated gas in some of the circuits to supply sufficient heat to vaporize the liquid short circuiting through the favored circuit. Since the rate of heat transfer from the evaporator tubing to the gas is low as compared to liquid, a great deal of evaporator surface must be used to pick up sufficient superheat to compensate for any liquid short circuiting through a favored circuit.

Location of Thermo Bulb

It is, therefore, well to provide ample suction line for thorough mixing of the suction gases from the different circuits before applying the thermo valve remote bulb. The capacity of a coil suffering from poor distribution may frequently be increased by inserting a length of suction line or a heat exchanger between the outlet of the suction header and the point of the thermo valve remote bulb application. Sometimes, in the case of a flooded evaporator, the only way increased capacity can be obtained when the distribution is poor, is by inserting an accumulator or a surge drum and heat exchanger so that the several short circuiting passes can slop over without having liquid return to the compressor. When this is necessary, be sure that you provide ample surge room and that some provision is made for oil return. If such a system is fed by a thermostatic expansion valve, be sure that the remote bulb is placed on the suction outlet of the accumulator, between it and the compressor, rather than between the coil outlet and the accumulator.

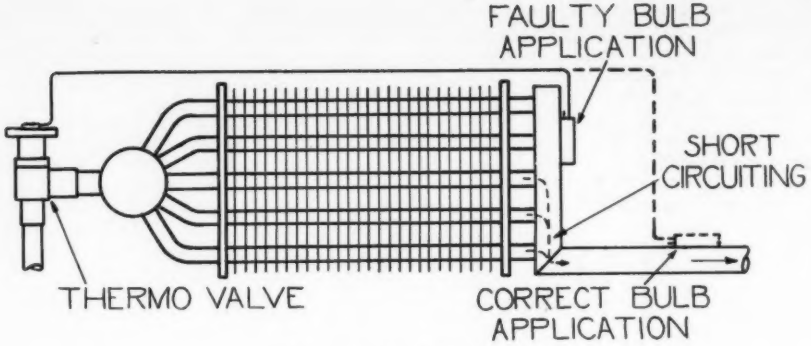


Fig. 9—Locating thermal bulb

4. *Use external equalizers on thermo valves.* As mentioned in the outline of the existing distributing devices, most of them require a sizeable pressure drop in order to work satisfactorily. This means that an intermediate pressure exists between the outlet of the thermo valve and the outlet of the distributor which is higher than the suction pressure in the coil itself. (Fig. 10).

If the thermostatic expansion valve is of the standard type equipped with an internal equalizing port, this higher intermediate pressure will hold the valve in a relatively restricted position, and will have the effect of reducing its capacity. This is true, for although the valve is maintaining the superheat for which it was set, this pressure drop across the distributor header and coil has the effect of raising the superheat setting on the valve and reduces the flow through it.

Since about 90 per cent of the distributor headers and devices in use today require fairly large pressure drops across them to make them work, it is a safe rule to always apply external equalizers to thermostatic expansion valves used to feed refrigerant to them. The external equalizer may be installed just beyond the distributor in one of the tubes feeding the evaporator circuit. This is generally the best place to install the equalizer since most of the pressure drop through the low side system will be across the distributor and very little of it across the tube circuits themselves. Note Fig. 10.

5. *Thermostatic expansion valves too small.* The capacity of thermostatic expansion valves varies as the pressure drop across them varies. An expansion valve is rated in tons capacity at a certain pressure drop across it. Now if the valve is selected for a certain pressure drop of, let us say, 60 pounds, and at that pressure drop has ample capacity, it will not have ample capacity if that pressure differential across it is reduced to 40 pounds. In selecting the proper size expansion valve you may figure that you will operate at a head pressure of 100 pounds and a suction pressure of 40 pounds, and, therefore, pick a valve with the proper capacity at 60 pounds pressure difference. Now if a distributor header is used which requires a sizeable pressure drop across it, this will reduce the capacity of the expan-

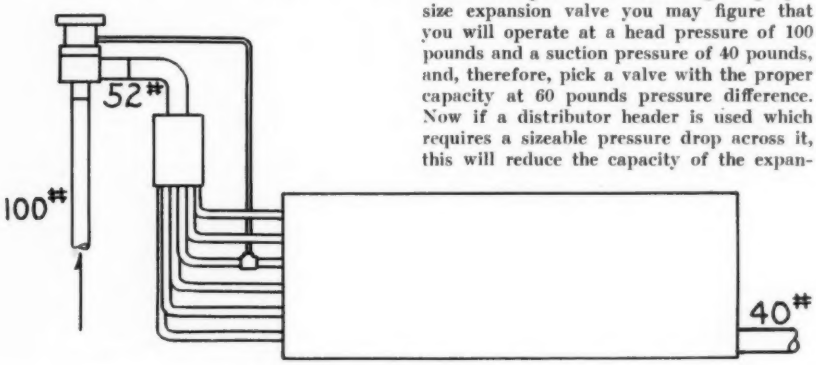


Fig. 10—External equalizer

sion valve. Let us say that the distributor header requires a pressure drop of 12 pounds. This will mean, then, that you will have a pressure of 100 pounds on the inlet side of the expansion valve, and a pressure of 40 pounds plus 12, or 52 pounds, at the outlet of the valve, even though you will still operate at a suction pressure of 40 pounds in the evaporator. Reducing the pressure difference across the valve reduces its capacity, and this may be the source of trouble.

It is, therefore, advisable in selecting and sizing thermostatic expansion valves, to bear in mind the approximate pressure drop across the distributor to be used.

6. *Check loading of each circuit.* If the parallel circuits are supposed to be equally loaded, be sure that they are. Often the distributor header is designed for equally loaded circuits which in actual operation are never equally loaded. If you are having difficulty with the distribution, check the loading and remove any obstructions or baffles which tend to unbalance it. This is a common trouble in the case of blower coils and spray type coils, and it is well to check the air flow and the flow of brine or water over the coils before blaming the distributor device or the coil itself. It is generally conceded that the pull-through type of fan will provide more equal loading on the blower type coil than the blow-through type, since it gives a more even air distribution across the coil face.

In conclusion, it is obviously desirable to do all possible to prevent distribution troubles in the design and installation stages. Select coils and distributors with care, bearing in mind the operating and loading requirements of the coil and the limitations of the distributor. Give careful consideration to the characteristics of the distributor where applying the expansion valve. Guard against unequal loading if the coil has been designed for equal loading. Learn to recognize distribution troubles on the job and you may often prevent unnecessary replacing of coils or expansion valves in an effort to increase capacity.

(Concluded)

* * *

Scott De Mots
Iowa.

Kindly send me two binders for your magazine as I am making a book of them for each year. It is a wonderful publication for refrigeration men, and they should profit a lot from it.

THE ULTIMATE IN TIME CARDS

PROVING that the ultimate can be reached in the analysis of time on the job, one of our readers sends us the following story of a neighboring contractor.

According to the story, a serviceman employed by the contractor was lax in itemizing his work card and had to be called on the carpet every so often. The work cards would improve for a short while, then slip back into the old rut again.

One evening about quitting time, the boss gave him a severe lecture on the subject, and while doing so the telephone rang. The call was from a customer requesting that their machine be changed back from city water to tower circulation. When the serviceman started to leave on the call, the boss reminded him that there was a length of pipe on the roof of the building, which was not being used, and that no one would miss it. The boss asked him to bring it in after the job was finished.

The next morning the serviceman greeted his boss with, "I guess that's enough darned report for you," and threw the original of the following work card on his desk:

TIME AND MATERIAL CHARGE

Changing from City Water Back to Tower Circulation

	Min.
Cleaning up water pump and repacking gland on same	27
Going from warehouse and shop to job	7½
Carrying pump from wagon to machine and placing ladder up to platform	1½
Closing king valve on machine	⅛
Putting switch on motor	⅛
Going back up ladder	1⅛
Drawing water out of pipes	2⅛
Disconnecting city water hook-up	9½
Setting pump on stand	1
Connecting pump to circulating lines	6
Connecting tower back on lines	7
Shortening belt on one end	6
Shortening belt on other end	5
Putting belt on pulleys	3
Starting motor	1
Opening king valve	1
Disconnecting length of one-inch pipe so I could steal it (as per instructions)	3
Dropping pipe and nine tower screws to ground from roof	¾
Loading stolen material on wagon	2¼
Tying red flag on back end of stolen pipe	2
Going back in market to see if machine was working o. k.	1
Looking at machine	7
Looking at machine again	3
Deciding that machine was working o. k.	2
Getting motor vehicle in operation	4
Observing that one headlight would not shine	1
Getting out of motor car and striking headlight sharp blow on lefthand side	1
Going back to shop and warehouse	9

Total, 115 minutes, or 1 hour and 55 minutes.
Material used, two 3" clipper belt laces, 4 rings of ¾" pump packing.

(Model 3040)

Air-O-Matic Absorption Unit

By GLENN F. ZELLHOEFER*

THE Air-O-Matic refrigeration unit is a new type of absorption machine which has been developed specifically to meet the unique requirements of air conditioning. The refrigerant used in Air-O-Matic is methylene chloride and the solvent is dimethyl ether of tetraethylene glycol. Both substances are essentially non-toxic, non-irritant, non-corrosive, chemically inert and chemically stable, thereby insuring freedom from health and fire hazards. Any possibility of breakdown of the working fluids and of internal corrosion of apparatus is also avoided.

An outstanding advantage of the Air-O-Matic apparatus is its inherently low working pressure. The low-side pressure in the machine will ordinarily be within the range of 21 to 24 inches mercury vacuum, and the operating high-side pressure, within a range of three-inch vacuum to four-pound gage. When the machine is idle, the high-side and low-side pressures equalize, ordinarily within the range of 15 to 20 inches vacuum, depending on the room temperature. The low pressures prevailing in the absorption unit make exceedingly remote the possibility of losing a refrigerant charge either when the unit is in operation or when idle. These low pressures also afford the advantages of very simple design and construction of the absorption unit, insuring trouble-free operation without supervision by skilled mechanics.

Definition of Sub-Assemblies

The absorption unit has six sub-assemblies.

1. *Absorber* in which the refrigerant vapor from the water chiller is absorbed by the weak solution.
2. *Heat Exchanger* for effecting the transfer of heat between the hot weak solution flowing from the heater to the absorber and the cool, strong solution flowing from the absorber to the heater.
3. *Solution Pump and Motor Assembly* to effect circulation of the strong solution from the absorber through the heat exchanger to the heater.
4. *Heater* in which the refrigerant is distilled from the strong solution.
5. *Condenser* in which the refrigerant vapor from the heater is condensed to a liquid.
6. *Water Chiller* in which liquid refrigerant is vaporized to chill the water circulated through this unit.

Cycle of Operation

The cycle of operation of Air-O-Matic is shown in Fig. 1.

When the solution-pump is placed in operation, the strong solution from the absorber is pumped through the outer passages of the heat exchanger to the heater. In the heater, the solution absorbs heat from the steam causing the distillation of the major portion of the refrigeration from the solvent. The refrigerant vapor which is released in the heater, flows to the condenser where it is cooled and condensed to a liquid by cooling water circulated through the condenser coil. The liquid refrigerant flows from the condenser through the dehydrator, to the water chiller where a float valve meters it into the unit as required. The heat absorbed from the current of water passing through the coils of the water chiller causes the liquid refrigerant to vaporize under the low pressures maintained in this unit, and the refrigerant vapor then flows to the absorber.

While the refrigerant is following its cycle from the heater to the absorber, the

*Air Conditioning Division, Williams Oil-O-Matic Heating Corp., Bloomington, Ill.

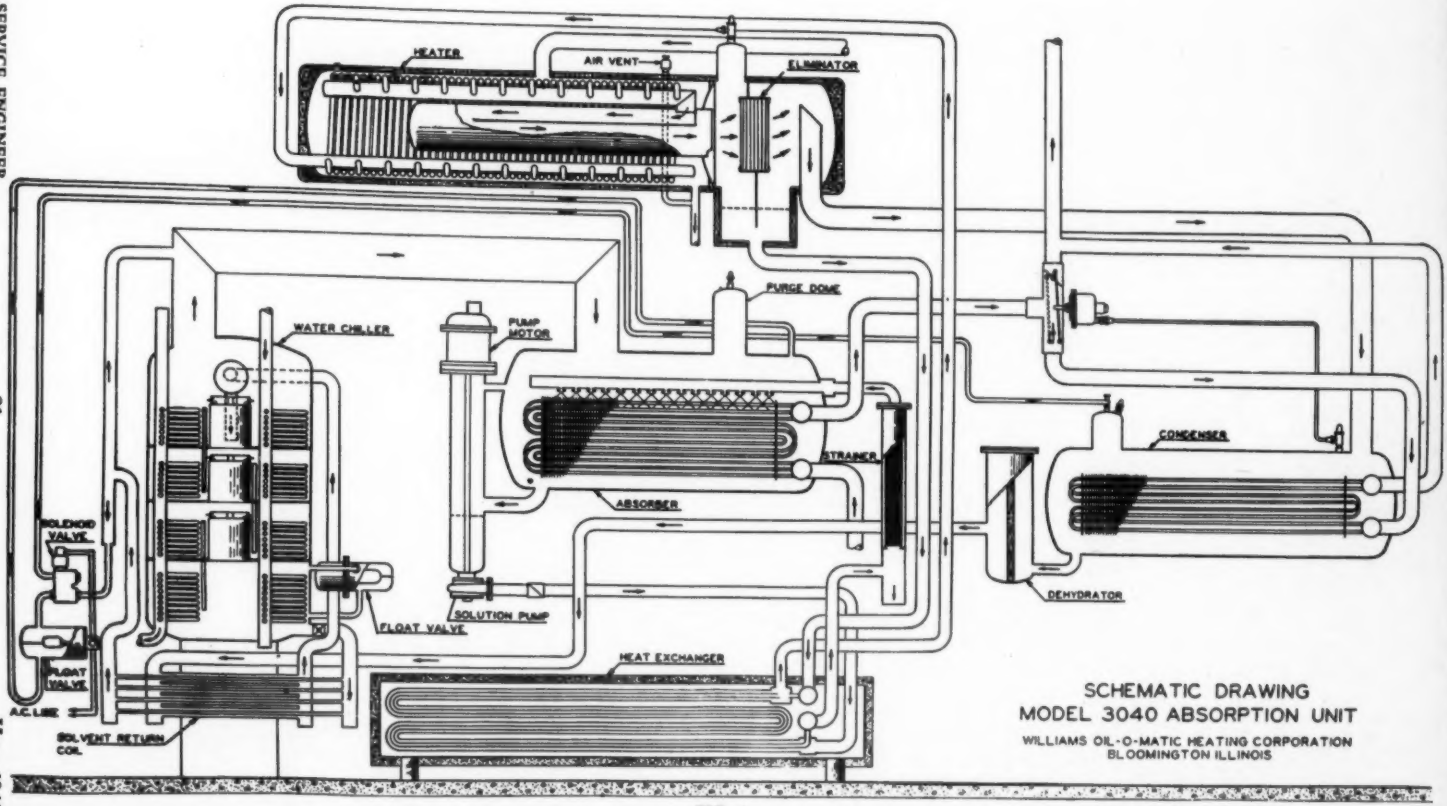

HEATER
AIR VENT
ELIMINATOR
PURGE DOME
WATER CHILLER
PUMP MOTOR
CONDENSER
STRAINER
ABSORBER
SOLENOID VALVE
DEHYDRATOR
SOLUTION PUMP
FLOAT VALVE
HEAT EXCHANGER
FLOAT VALVE
A.C. LINE
SOLVENT RETURN COIL
SCHEMATIC DRAWING
MODEL 3040 ABSORPTION UNIT
WILLIAMS OIL-O-MATIC HEATING CORPORATION
BLOOMINGTON ILLINOIS

FIG. 1.

weak solution in the heater flows through the inner passages of the heat exchanger to the absorber. This solution is discharged through the absorber nozzles under a pressure differential of three to four pounds, forming a fine spray which impinges upon the absorber coil and then flows downward over the fins of the coil in a thin film, absorbing the refrigerant vapor that enters the absorber from the water chiller. The strong solution, formed by absorption of the refrigerant vapor, flows by gravity to the suction of the solution pump and is returned through outer passages of the heat exchanger.

The cooling water circulated through the absorber coil dissipates the heat generated by the absorption of the gaseous refrigerant.

This cycle of refrigerant and solution continues as long as the solution-pump remains in operation, thereby continuously absorbing heat from the current of water in the water chiller and continuously liberating heat in the absorber and condenser unit.

When the solution-pump is stopped, the solution from the heater flows into the absorber and an equilibrium is established between the pressure in the high side of the system and the low side. When the pump is again started, the discharge of this volume of highly concentrated solution into the heater affords the generation of the necessary head pressures to effect the circulation of the weak solution from the heater to absorber. However, to insure the immediate generation and maintenance of normal head pressure, there is provided a pressure control valve in the water line to the condenser which by-passes the flow of cooling water around the condenser until there is attained normal refrigerant vapor pressure in this unit.

With the maximum head of solution on the inlet of the solution-pump, this pump is designed to discharge the solution from the absorber at a rate equal to the maximum flow under any normal operating condition. Under those operating conditions in which the flow of solution is reduced, the capacity of the pump is automatically reduced by the reduction in the solution head on the suction inlet.

Cycle of Refrigerant Through Water Chiller

A float valve, actuated by the refrigerant level in the lower section of the chiller, controls the flow of refrigerant from the condenser to the water chiller. The liquid refrigerant, together with the flash vapors which are generated in passing through the valve, are discharged into a cylindrical baffle located in the top of the chiller. The flash vapors, free from entrained liquid refrigerant, escapes through the baffle while the liquid refrigerant gravitates downward through the several sections of the chiller to the bottom. The vapors generated by the vaporization of the liquid refrigerant escapes through the outlets at the center of each section. These vapors flow to the top of the chiller assembly and thence to the absorber.

Solvent Return. Approximately one part of solvent in seven hundred parts of refrigerant is carried over from the heater to the condenser and thence to the chiller. As the refrigerant is vaporized in the several sections of the chiller, the concentration of the solvent is progressively increased. Solution of solvent and refrigerant is drained by gravity through an orifice from the bottom section of the chiller into the inner-tubes of a solvent-return. The hot liquid refrigerant flowing through the outer-tubes of the solvent-return vaporizes approximately one half of the refrigerant from the solution as it flows through the inner-tube, and the remaining solution is entrained by the released vapors and carried to the absorber.

The orifice in the line between the bottom of the water chiller and the assembly of inner-tubes of the solvent-return, is so adjusted that the rate of flow of the solution to the solvent-return is such that the solution will be heated to 60—70 F. by the heat available in the hot liquid refrigerant flowing through the outer tubes of the solvent-return.

In this manner, the trace of solvent carried over from the heater is returned to the absorber, and the concentration of solvent in the refrigerant of the chiller is maintained at a sufficiently low level to avoid any appreciable rise in the boiling temperature of the refrigerant for any given vapor pressure, and in this process the loss of refrigeration affect is nil.

Construction Features

Principal features of each of the sub-assemblies comprising the absorption unit are described below:

1. *Absorber.* The absorber consists of a shell, cooling coil, and a bank of nozzles.

The nozzle bank is located above the cool-

ing coil and the nozzles are so designed that the sprayed weak solution is directed over the cooling coil to insure equal distribution. There is provided a strainer between the heat exchanger and the absorber nozzle bank. The screen on the strainer may be readily removed for cleaning.

Any scale deposit in the water passages of the absorber coil may be removed by circulating through these passages a solution of ½ per cent "inhibited" hydrochloric acid and 99½ per cent water. Since the coil is of all-copper construction, there will be no corrosion if conventional practice of this cleaning method is followed.

2. *Solution-Pump.* The solution motor pump assembly consists of a centrifugal pump, ¾ h.p. motor, extended shaft with flexible drive connection and housing.

As standard equipment, there is offered a 60 cycle, 220 volt, three phase, 3600 r.p.m., induction type motor. All motors have special impregnated windings for service in a closed atmosphere of refrigerant vapors.

3. *Heat Exchanger Assembly.* The heat transfer surface of the heat exchanger is made of six sub-assemblies consisting of corrugated, copper plated, steel sheets, approximately 2.5 inches wide, seven feet long, and .018 inches thick. Each of these sub-assemblies fit tightly in a steel casing and they are manifolded to form a serpentine assembly. Weak solution is circulated through the inner passages of the assembly and the strong solution is circulated through the outer passages.

The entire assembly is insulated and housed in a sheet metal case.

4. *Heater.* The heater consists of a steam jacket, vapor release chamber, an eliminator, and a series of helical solution coils. Each of these coils is made of copper tubing ¾ inch in diameter and 15 feet long. One end of the coil is connected to the inlet manifold and the other end to the outlet manifold. The outlet manifold discharges the refrigerant vapors and solvent into one end of the vapor release chamber, and at the opposite end of this chamber is an eliminator to separate the entrained solvent from the refrigerant vapors.

5. *Condenser.* The condenser consists of a steel shell and a serpentine copper coil with extended surface.

Those installations where the water temperature entering the absorption machine is 90 F. or higher, and the refrigerant temperature in the water chiller is 44 F. or higher may require a condenser larger than the "standard condenser." Information on special condensers may be obtained from the factory.

(To be continued)

S S S

REFRIGERATOR REPAIR SHOP ON DISPLAY

PASSERSBY at 1639 Monroe Street, Madison, Wisconsin, can now observe mechanics working at benches which line a side and the rear wall on the main floor of the Meinke Refrigerator Service Company's shop. The contrast presented by gleaming, white-enameled appliance units placed next to twirling lathes, buffers and other mechanical devices is striking, and serves to emphasize the fact that the shop specializes in the rendering of scientific, factory-method repair service.

Used refrigerators and other used appliances, which formerly occupied this space, have been moved to a newly created showroom downstairs. Mr. Al Meinke, proprietor of the shop, states that the change has increased the efficiency of the company's repair work and has reduced operating costs as well.

"We have built our business on service and we want to inspire confidence in our service with users of mechanical equipment," said Mr. Meinke in explaining the change. "Service is important to users of mechanical equipment and we believe they are therefore interested in knowing how repair work is handled—what operations are involved and what equipment is necessary to fit a well equipped shop. That's why we have brought our shop out into the open where they can see just exactly how we go about our work."

Equipment in the first floor shop includes a spray paint booth for refinishing refrigerators and other enameled appliances, electric welding equipment, work benches and lathes.

S S S

Geo. P. Stein
New York.

I am well pleased with my copies of THE REFRIGERATION SERVICE ENGINEER and recommmend it highly to all my friends.

Eldon C. Wolfe
Indiana.

Please find enclosed $2 for the REFRIGERATION FUNDAMENTALS. I like the book very much.

Controlled Refrigeration in Beverage Dispensing

By JAMES J. GOODWIN*

THE important part that refrigeration in general plays in the beverage dispensing field is well known, therefore, the purpose of this article is to emphasize the extreme importance of controlled refrigeration.

In the manufacture of carbonated beverages, the temperature of the liquid and the CO_2 gas pressure are the two controlling factors in obtaining the proper degree of carbonation. The carbonation value can be increased or decreased by reducing the temperature or increasing the CO_2 pressure in the first case, or by raising the temperature or lowering the pressure in the second case. However, in the dispensing of carbonated beverages one of these two controlling factors is eliminated, namely, the control of the pressure, because, as the beverage enters into the glass from the dispensing system it is under atmospheric pressure regardless of the temperature. Thus, temperature control is much more important in the dispensing of beverages than it is in the actual manufacture of these beverages.

To illustrate the importance of controlled temperature, let us consider for a moment the dispensing of draught beer, and, of course, other beverages that come into this same general classification such as ginger ale and root beer, etc. The two factors governing the desirability of a glass of draught beer are the taste and the appearance of each glass. In addition, there is a third very important point to be considered and that is the economy of dispensing.

In serving draught beer, all three important points, namely, flavor, appearance and economy of dispensing are controlled by the release of CO_2 gas from the liquid body of the beer. The head or foam on a glass of beer is, of course, generated by the release of the CO_2 gas, because the gas, in being released, forms very fine, minute bubbles which show up as head or foam. On this head or collar depends the appearance of the glass of beer. The release of CO_2 gas from the body of the beer also affects the flavor because, if a sufficient amount of gas is not released, the beer will have a sharp, bitter flavor caused by an excess of gas remaining in the beer; if too much gas is released, the beer will have a flat, unappetizing flavor.

Temperature Most Important

The amount of CO_2 gas released from the liquid beer is controlled by its temperature. It has been determined from many years experience that a 40° glass of beer is desirable for most sections of the country. The breweries have taken this particular serving temperature into consideration, and for the most part, beer served at exactly 40° with the proper equipment, will release just the right amount of CO_2 gas to form a collar or head varying between 20% to 25% of the volume of the glass. An allowable variation in temperature is permitted; however, this should not at any time vary any appreciable extent. If the temperature of the beer was to vary 3° or 4° or more degrees, there would be a decided difference in the amount of CO_2 gas released, and as a result, a decided difference in the flavor and appearance of the beer and economy of operation. As the temperature is raised, a greater percentage of CO_2 gas is released which increases the percentage of foam or head in the glass, and at the same time changes the flavor of the liquid beer. The amount of foam generated could reach such a proportion that the economy of dispensing would be seriously affected. On the other hand, if the temperature is too low, the right amount of CO_2 gas will not be released and the glass will have a flat appearance even though there is an excess amount of gas still remaining in the liquid beer. At the same time, the decrease in CO_2 gas released means that the proper percentage of foam is not evident in the glass, and as a result, it must be filled with solid beer which is neither economical nor appetizing.

While this article, for the most part, deals with draught beer dispensing, the majority of the troubles caused by lack of controlled temperature, will also be encountered in the

* Sales Engineer, Temprite Products Corp., Detroit, Mich.

dispensing of other carbonated beverages such as ginger ale, root beer and Coca Cola. Temperature control is just as important with these beverages because of their syrup and CO_2 gas contents.

It is, of course, obvious to those people familiar with beverage dispensing that temperature control alone is not the only factor that must be considered. Many factors such as the design and construction of the beverage cooling coil, proper type of accessory equipment, such as faucets, tapping rods, connecting lines and ease of cleaning and handling are all important and must be taken into consideration if satisfactory results are to be obtained.

The Question Box

Readers are invited to send their problems pertaining to the servicing of household refrigerators and small commercial refrigerating equipment to "The Question Box."

THE PROBLEMS OF THE ANSWER MAN

Question Box: Will you please tell me the trouble with a Westinghouse DC-60 that runs and has 40 pounds of pressure and yet will not freeze?

While the above letter addressed to the Question Box cannot be called typical of of those received, it is an extreme example of the problems of the Answer Man. A large precentage of the letters received by this department, the greater portion of which are never published, contain so little information of the kind needed to diagnose the trouble that it is impossible to give an intelligent answer.

It is always more difficult to analyze troubles from information contained in a letter than from information obtained directly from an examination of the equipment; therefore, to help overcome this handicap, won't you please provide as much information as possible, including, where possible, a sketch of the layout of the system?—Editor.

MODEL T-5 FRIGIDAIRE

QUESTION 436: I am having trouble with an old Model T-5 Frigidaire, 1/6-h.p., 1⅝-inch bore, ⅝-inch stroke, 380 r.p.m., single cycle. It contains an elongated coil condenser cooler and a thermostat control that uses a regulating valve with an equalizing bulb. It is charged with SO_2, and the unit is equipped with three one-way valves.

Three years ago I examined this compressor and found the flapper valve gone bad, but since the owner refused to have a new one ordered, I had to repair it the best I could. The little fiber button in the valve had gone to pieces, so I made a duplicate from a nail head. The unit operated very well for three years, and then trouble began again. In the meantime, I had obtained a new type flapper valve assembly.

This time I drew down the charge into the receiver, and it took some time to get down to about 20 inches vacuum; when I wanted to crack back, I opened up the valve in the head to get the vacuum up to zero, but without success. Perhaps I could have waited a long time and allowed it to leak in—the vacuum seemed to be holding well—and it might have taken a long time to leak back, because it seemed as though the vacuum wouldn't drop. I couldn't open the unit because of the vacuum, so I had to leave it as it was, because the owner wouldn't wait. He went on using it as it was, and now there's a "ping" in the compressor. I notice that after the compressor stops running and I turn the wheel over, there is no heavy pull on the flywheel. The unit freezes some, but not as it should, and its running time is about equal to its stopping time. What do you think this "ping" is? Why is it that I can't crack back and get this vacuum off and allow a little pressure so that the unit can be opened up?

The quickest and only way I can see is to release the gas into the air from the suction valve side, since it is the only outlet; I can put the vacuum gauge on the suction valve, and when pressure registers on the vacuum gauge, I can open the unit and release the gas.

Another bad thing about this unit is that the compressor is in the basement and has been under water four or five times. The owner just takes off the motor when the basement is flooded. If I do any work on the system, I will raise it. One can't tell

much about how well the shaft seal holds under water.

The piston doesn't stick, and the system shows no signs of moisture.

ANSWER: The only way I can suggest that you may balance the pressures in the model T-5 Frigidaire after you have pumped down the lowside to the best vacuum you can obtain, is by opening up the expansion valve to its wide-open position, then cracking the receiver valve, permitting a small amount of liquid refrigerant to enter the lowside. You have to be very quick in the operation of this valve so as not to permit too much liquid to enter before you get the valve closed again.

The pressures will rise to above zero, but since you have managed to pump out all the liquid prior to this operation, it would be simple then to start the compressor and allow it to pump down to zero without pulling down to a vacuum. In this way, you can balance the pressures in the system, which will permit you to open it for repairs.

I am unable to tell you what the noise described by you as a "ping" in the compressor is. It may be any one of a number of things, and you have not given me a sufficient description to make any suggestions as to where to locate it. It is quite possible that after such a long period of service, this compressor is fairly well worn and that new rings or new pistons would be required in it. These will be things you will have to check after you are able to remove the compressor and test it on the bench.

I certainly agree with you that if it becomes necessary to overhaul the compressor, in order to obtain the necessary efficiency, the customer would be better off to purchase a new compressor. Going to the extent of purchasing a complete new unit would not pay unless the cabinet is of the modern style and is in extremely good condition. New refrigerators today are so low-priced that it is not worth while spending a great amount of money on a refrigerator that has reached the age of this one.

INSTALL CAPILLARY TUBE ON DEFECTIVE FLOAT VALVE

QUESTION 437: Thank you for your recent letter. With reference to the last paragraph of your letter, you suggest replacing the evaporator and installing an automatic expansion valve on the new evaporator. Recently I have heard that some of the service men have retained the old float evaporator and added an expansion valve to govern the flow of liquid into the evaporator.

By the above-mentioned procedure, I believe the needle valve would be left out of the assembly. Do you believe that the expansion valve on the old evaporator would do the trick, or is it only hot air? I am wondering what effect the small hole at the needle valve seat would have on the flow of gas. Would it also act as a metering device?

ANSWER: I don't believe I can advise using an expansion valve on a flooded type evaporator. This has been done in the past, and sometimes, I suppose, successfully; however, you are taking considerable chance in attempting such an operation because the greater number of such applications will fail entirely or cause you so much trouble that the cost for free service will be exorbitant.

If you intend keeping the evaporator now installed on this refrigerator, I would suggest that a capillary tube be used, converting the system to a capillary tube type. Approximately ten feet of .095 OD tubing should work satisfactorily with this unit.

After installing the capillary tube, you will find that the system is very critical in the amount of refrigerant required for it. Refrigerant will have to be added until frost begins to appear on the suction line, then a slight amount purged off until the frost line on the suction line remains steady about two or three inches out of the evaporator.

It would be necessary, of course, to remove the needle valve and needle from the float, but the small opening through the needle valve would not affect the operation with a capillary tube.

ADJUSTING TEMPERATURE

QUESTION 438: I have an evaporator that has arrangements for freezing ice cubes in the bottom and has fin coils on the top. The tubing is one continuous length through the evaporator. The compressor is a ⅓-h.p. methyl chloride unit with pressure control. The case containing this evaporator is about 8 feet high by 8 feet long by 3 feet deep, and is designed with 5 doors and 4 compartments.

On my first call, I found the top of the expansion valve broken. This valve was one of the older types of Detroit Lubricator thermo expansion valves. I replaced the

(Continued on page 40)

COMMERCIAL

INCREASE BUSINESS BY DOING A MORE EFFECTIVE JOB OF SELLING *Selling*

Building Sales with SERVICE

By Lucius S. Flint

* * *

"FIRST-CLASS service is the best feeder for equipment sales any commercial refrigeration dealer can have!" declares E. L. Alford, head of the E. L. Alford Co. Inc., Albuquerque, N. M., one of the leading commercial refrigeration dealers of the Southwest.

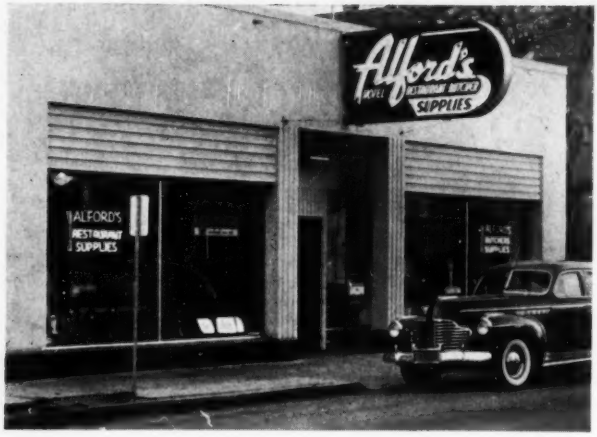
Although specializing in sales and doing very little outside service work, the Alford Company maintains one of the largest service department staffs in New Mexico, regularly employing three full-time mechanics. The principal job of those men is to keep users satisfied. Mr. Alford maintains that if a service department effectively accomplishes this purpose, its existence is completely justified if it never shows a nickel's worth of direct profit.

However, because of the very standard of quality maintained in the service operation, the Alford service department is a completely self-supporting one, and has never yet failed to show a healthy profit. The company sees to it that customers are so completely satisfied with the free service given during the period of their guarantees on equipment that they would never think of calling anyone else but Alford later on.

"Here's something that counts for more than anything else I know of," continues Mr. Alford. "We're never the least bit technical about the length of our guarantee. If something happens to go wrong with a piece of equipment a month or two after the guarantee is out, we take care of it without charge. And in cases where we feel that the fault lies with the equipment rather than in any abuse by the user, we'll render free service a year or two after the guarantee has run out. Little things like that are worth more in building a permanent clientele than all the advertising and sales promotion in the world.

"Hardly a week goes by but what we sell a major installation on the basis of recommendations. The trade associations in various lines bring the different members of any line of business together and don't think these men don't discuss their suppliers plentv. What's said in those roundtable discussions can literally make or break any equipment man. We see to it that they work to our advantage."

Because of the attention paid to service, the Alford establishment is always the first to get leads on new equipment needs. The commercial refrigeration user who's going to need an additional box or plans to replace an old piece of equipment will usually mention this fact to the service man before



Modern store-front of the E. L. Alford Co., Inc., Albuquerque, New Mexico, is typical of the up-to-date policies of this growing Commercial Refrigeration firm.

he ever starts actual shopping for the equipment. Such leads are reported to the sales force instantly and are followed up before competition has a chance to get in.

As a means of maintaining a constant contact with commercial refrigeration users and for the purpose of holding service expenses to a minimum under guarantees, the company handles all service work on a preventative basis. Whenever a service man goes out on a repair or installation job, he is given a list of other equipment in the neighborhood and is required to inspect every piece in use. In this way, the company keeps equipment functioning much more efficiently than would otherwise be possible—an important step toward creating good-will and customer satisfaction—and at the same time discovers minor repair needs before they develop into major ones. Customers who get used to this frequent inspection service like to have it carried on even after the end of the guarantee period, are almost always willing to follow the company's recommendations for preventative maintenance work when it is needed.

The result of all this is a *steady* volume of low-expense service work. Out in this Western territory, distances are large and towns comparatively small. Only by handling a maximum amount of work in any one locality when a man is already there can the company keep costs down for the customer and at the same time make a profit.

As a further means of maintaining the proper balance on prices and profits, the Alford Company maintains a complete office control of the service operations. The mechanics are required to make out a detailed report on every single job showing the key number of the part used, its description and price, a description of the work done, the amount of labor spent in man-hours, the mileage spent and so on. The company turns out these service order forms on its own mimeograph, thus minimizing their cost. Each form carries a serial number so that there is no possibility of oversights.

Right from the start, the Alford policy has been to render service at the lowest possible cost to the customer, consistent with profitable operation. Wherever the company can save the customer a little money, that's considered as a feather in the mechanic's cap for after all the principal aim is to develop repeat business and additional sales.

Still another important advantage of the type of service operation maintained, lies in the fact that the company can be confident of good recommendations when it refers prospective customers to old users. When an Alford salesman is figuring on a new piece of equipment in almost any

Service order form used by the Alford Co. which the men must fill out completely so the office can maintain an accurate record of parts, etc. Actual size 8½" x 11".

SERVICE ORDER

E. L. ALFORD CO. INC.

ALBUQUERQUE, N. M. **No.....**

For..... Work Requested:.....

.....

.....

Received By:.....Date:.....Terms:.....Model:.....Serial.....

Part No.	Description	Price		Work Done
.....	.....	.....	.....	.....
.....	.....	.....	.....	.....
.....	.....	.....	.....	.....
.....	.....	.....	.....	.....
.....	.....	.....	.....	Labor: Man Hrs....@..../ Hr.
.....	.....	.....	.....	Expense: Miles....@ $.05 /Mile
.....	.....	.....	.....	Misc.....
.....	.....	.....	.....	Materials.....
.....	.....	.....	.....	Total.....
.....	Total.....	.....	.....	Accepted :.....

locality in the territory covered, he can refer that prospect to a neighbor and be sure of a favorable recommendation.

"Service is the most important thing any commercial refrigeration man has to sell," concludes Mr. Alford. "In today's market, there is a variety of good equipment available and prices are pretty largely standardized. Consequently, the dealer who can convince his prospect that he stands behind his merchandise and renders a superior type of service is the fellow who usually gets the deal. And once you get the deal, if you'll remember that the customer looks to the supply house to keep that equipment in shape for three years—regardless of the terms of the guarantee—you'll be ahead in the long run."

Servicemen are *Salesmen* for this Firm

By Robert Latimer

"WE won't have a serviceman who can't double in brass as a salesman!" Those are the words of Lloyd Goodwin, executive manager of the North Side Refrigeration Service Co., large commercial refrigeration maintenance agency of St. Louis, Missouri—and they sum up one of the major policies of this company contributing to its success in a highly competitive field.

The North Side firm, an authorized Frigidaire agency, selling a line of commercial refrigeration as a "sideline" has been in business for six years, during that time concentrating the larger part of its promotional activity on building up long-term service orders from hundreds of commercial users in St. Louis. With a staff of from four to six service men, Mr. Goodwin has been able to cover the entire northern business area of St. Louis twice a year with promotional contacts, and is firmly convinced that the greatest business opportunity in the refrigeration service field lies in how effectively the company "merchandises" its service ability.

"We believe that guaranteed service can be sold just like actual merchandise," Mr. Goodwin says. "And contiguously, that it requires quite a bit of definite promotional work to bring in more customers. For that reason, we consider our staff of service men not only as repair and service assets, but

also as salesmen with an opportunity to increase their own income as well as ours by bringing in a steady stream of new customers."

Under this policy, all service men in the North Side Refrigeration Service Company actually become salesmen as soon as a slack period in their service calls appear. There are usually several such instances per month, when Mr. Goodwin appoints each to a separate territory, and sends them out as "goodwill builders" to sell commercial refrigeration owners as yet uncontacted on the idea of trying the North Side firm's service for an experimental period. Servicing at present some 500 accounts Mr. Goodwin is convinced that at least 200 of these originated through sales efforts of his service men; this in turn is traceable to the fact that all are veteran employes, and enthusiastic boosters for the firm.

The Prospect List

This "salesman" theory operates on a "prospect list" theme—derived from a huge file of more than 8,000 refrigeration users which is maintained in a four-drawer steel file in the North Side office. Orange cards give the names, addresses and pertinent facts concerning users of air conditioning, green cards show ice-making, cooling, and general refrigeration. In addition, there is a huge file of cream-colored cards which detail all domestic refrigeration users of the company territory. This file is maintained religiouslv, because it has proven to be one of the most effective roads to better business.

Whenever service calls, which are issued twice daily, hit a low point which means that one, two, or even three men have no rush assignments to carry out, the office file is brought out by Mr. Goodwin, and run through for the purpose of selecting potential new accounts. These of course are installations which have been brought to Mr. Goodwin's attention, but for some reason are not on the books as customers. From five to ten such cards are turned over to the servicemen, whose responsibility is then to spend their "free time" in making friendly calls on the prospects. As a form of canvassing, it has proven to make new customers in numerous instances, and to acquaint the prospect with the firm name so thoroughly that when he experiences a breakdown, his first thought is to call North Side Refrigeration Service.

The Reminder Card

Perhaps the most clever material aid to this canvassing plan is a new type of "reminder card" which Mr. Goodwin has originated for his men. As illustrated, it is a 6x7 inch card of glossy, durable cardboard, on which the name of the firm, phone number, and address is printed in dark blue ink. Copy below reads "Your refrigeration equipment earns and saves you money every minute of the day. In your interest, therefore, these suggestions are offered for the care and maintenance of this valuable equipment." Listed then are such points as monthly motor oiling, cleaning dust from condensers, proper fuses, air circulation, etc. Finally, the card points out the reputation of the North Side firm, and stresses its wide shop service. On each call, the service man has instructions to ask for permission to thumbtack this card permanently near the compressor on refrigeration systems—where it will be a "silent salesman" thereafter.

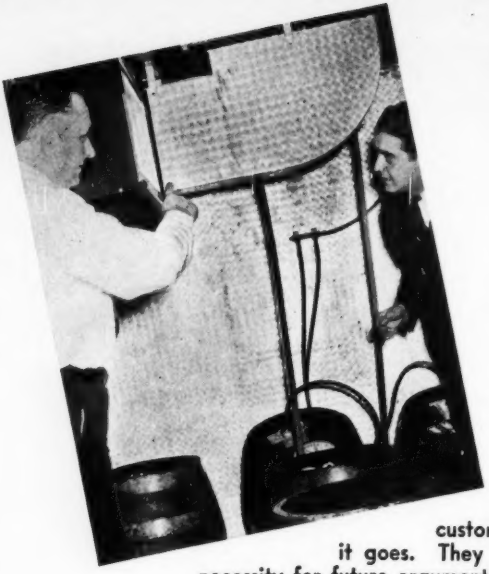
These cards were developed only recently, and already are showing excellent returns. Few refrigeration service users have any objection to allowing it to be placed near their equipment, and thus North Side Refrigeration Service often gets the "first call." Another advantage is that showing the card to the prospect, who may be anyone from the owner of a small ice cream parlor to the superintendent of a department store, and getting him to actually "feel it" causes him to remember it instantly when sudden trouble occurs. While putting up the card, the service-man "salesman" explains that his firm also has an emergency night telephone number, maintained by a telephone-answering service, which enable them to get a service man to any location quickly. Informative conversation of this type, it has been found, brings returns in future business.

NORTH SIDE
Refrigeration Service
INCORPORATED
EV. 1900
4914 NATURAL BRIDGE
Your refrigeration equipment earns and saves you money every minute of every day. In your interest, therefore, these suggestions are offered for the care and maintenance of this valuable equipment.
OIL MOTOR MONTHLY.
CLEAN DUST FROM CONDENSER WHEN NECESSARY.
USE PROPER SIZE FUSES AT ALL TIMES.
ARRANGE CONTENTS OF REFRIGERATOR TO ALLOW FREE CIRCULATION OF AIR.
And, remember, if repairs or parts should be required, call a responsible service company. We have the organization, experience, and complete equipment necessary to give you dependable service twenty four hours every day. Guaranteed and immediately available, the service we offer is the most satisfactory and economical.
AUTHORIZED FRIGIDAIRE COMMERCIAL AND AIR-CONDITIONING SALES, PARTS, AND SERVICE
PHONES
8 A. M. to 5 P. M. EVergreen 1900
Nites, Sundays, Holidays GRand 1160, Station 17

Reminder card which the Service-salesmen tack up wherever possible.

North Side Refrigeration Service runs absolutely no contract service on equipment, preferring instead to use the time-plus-materials charge theory. This policy has proven to bring in a larger revenue per call without interfering in any way with business realized.

Thus, by using slack time as "sales hours" for servicemen, the St. Louis refrigeration service firm has been able to add many air conditioning accounts, commercial refrigeration, and other types of service business to its books. On these calls, service men wear their business suits, drive their own automobiles, and have been factory-trained to quality as advisory engineers on any type of mechanical refrigeration problem.



"Put it in Writing!"

Novel form helps eliminate customer complaints . . . . .

By Herbert Hanley

***The salesman points out to the customer just what is needed and where it goes. They put it in writing and eliminate all necessity for future arguments, complaints, and ill-feeling.**

PERHAPS one of the worst drawbacks to the servicing and sales of commercial refrigeration and air conditioning of all kinds, according to James & Company, large service and distributing company of Missouri, is the frequent lack of harmony between customer and service firm—usually caused by too low cost estimates, overpromising of equipment on replacement sales, and like difficulties which tend to anger everyone concerned.

James & Company, who sell both large-scale commercial equipment and air conditioning, and service refrigeration of all types, has spent more than five years in studying this matter, with the result that Henry Weis, Jr., manager of the commercial department, has developed a clever "Customer's Agreement" which removes once and for all the possibility of injured feelings when a service or sales contract is carried out. He has found that inevitably the worst point in establishing friendly relations with commercial refrigeration users is the competition coming from small sales and service organizations which are likelv to close their doors at any time. These concerns, he points out, feel no worry in promising service to extend for five and ten years; low prices in the future, and offering extra equipment free.

"Like other large firms, we must admit frankly that we've been bothered with competition coming from this source" Mr. Weis pointed out, "Mainly from get-rich-quick appliance dealerships and basement service shops who are interested only in selling whatever business or service they can at the moment, no matter what must be promised to secure it. Their responsibility as a rule extends only a few months in advance of the date of any sale, and almost no time after it."

"The worst feature of this type of competition comes with sales" Mr. Weis added, "Because of the onlv human desire to get a sale with some additional merchandise promised which makes the buyer feel he is getting more for his money. We have found instances in which one of these service agencies has promised a bottle cooler with the sale of a new meat or delicatessen case, thrown in half a dozen electric fans with a water cooling system, and many other similar deals."

The James Company, operating over St. Louis and suburbs, has seven salesmen, whose duties include "booking" of com-

JAMES & COMPANY, INC.

EQUIPMENT CONTRACT

Salesman_____ Date_____

Customer_____ Residence_____

1. The undersigned, hereinafter referred to as the Company, agrees to furnish for immediate acceptance, at a price hereinafter named, the equipment indicated below IN WRITING and to furnish the labor required to install it at

Address_____ City_____ State_____

EQT.

1._____

2._____

3._____

4._____

5._____

6._____

7._____

8._____

9._____

10._____

Alterations, if any, shall be expressly indicated below, IN WRITING.

1._____

2._____

Used equipment, if any shall be removed by: and will become the property of:

List below, IN WRITING, all used equipment to be moved, removed or disconnected.

1._____

2._____

2. The Company further agrees to install this equipment with Union Labor, during regular working hours of regular working days, in accordance with this WRITTEN contract and the Wage and Hours Law and other laws now in effect pertaining to this work.

3. The Company further agrees to make the electrical connections to all remote equipment installed by it, but assumes no responsibility for the existing wiring on the premises.

4. The Company further agrees to supply shut-off valves for all fixtures over one and to furnish the necessary tubing and fittings to complete the installation of the equipment.

5. It is mutually agreed that plumbing is not included in this contract unless indicated above, IN WRITING. It is further agreed that dehydrators, strainers and so forth are loaned and will be removed by the Company, after they have performed their function.

6. It is mutually agreed that the Company shall not be held responsible or liable for any loss or damage resulting from delays in furnishing materials or service, when prevented from doing so, by fire, flood, strikes or any other causes beyond the Company's control; nor in any event for special or consequential damages.

7. It is mutually agreed that the purchaser assumes all responsibility for loss by fire, flood, theft, damage or destruction of equipment, immediately upon delivery to his premises.

8. It is further agreed that the Company is not responsible for electrical or water failures, which may cause the equipment to become temporarily inoperative.

WARRANTY. New equipment carries a standard warranty against defects in material and workmanship for a period of one year from date of installation. Alteration, misuse or abuse of the equipment will void the warranty. Service adjustments will be made without charge during the warranty period.

This equipment will be furnished and installed in accordance with this contract for the sum of_____

JAMES & COMPANY, INC.,

Date Accepted: _____

By: _____

_____

_____

TP 19 1m 6-40

The Customer Agreement Form used so successfully by James and Company.

mercial refrigeration service, sales of a complete line of commercial refrigeration from reach-in cases to direct-draw beer draught systems, and contract service for air conditioning using G. E. equipment. Manufactured by the company are two specialties which have proven to be an excellent calling card for more business—the beer system mentioned above, and an efficient dry bottle box for use in taverns, hotels, clubs, and stores. With so complete a merchandise and service lineup, sales

management to rid the office of complaints has been an exceedingly delicate job.

Five years ago, after several hundred dollars per year loss from unredeemable promises made by salesmen, Mr. Weis developed what has ever since been the practical answer to this difficulty—the clever Customer Agreement slip shown in the accompanying illustration. Carried by every man on the staff, this must be turned in with every contract, whether for service or merchandise, and thoroughly checked before the work involved can be undertaken.

Keeps the Salesmen in Line

With the fact that the agreement slip is designed primarily to keep salesmen from growing over-enthusiastic in their desire for a sale by promising "free goods" the use of each has cut complaints to a mimimum—and there has been no loss since it began.

As can be seen from the Customer Agreement slip, it contains specific sections which state all facts, whether alterations are to be made and how much, whether the used equipment removed shall become the property of James & Company, whether James is to install the plumbing or leave this to another contractor, and how much actual equipment will be purchased under the contract. This slip is made out in triplicate, one copy to the office, another to the customer, and a third given to the installation crew. Every nut, bolt, fan belt or other item involved must be clearly shown before the James Company will go ahead.

Fill Out the Slip

"We ask our men to fill this out with the customer's help simultaneously with the contract," Mr. Weis explains "with the thought that while the customer signs the contract, he will not mind also signing the Customer Agreement—whereas if we come back at him with it later, he is likely to feel rankled by it. Then, we go entirely by what is detailed on the agreement during the installation."

Thus the customer gets everything promised him—if fluorescent lighting is offered free, he is given it, with the wholesale cost split between the salesman and James & Company. Occasionally James & Company will make such "premiums" available to the buyer—but only where competition makes it necessary. In one instance, a customer whose equipment had been serviced by James & Company for more than five years ordered a new cooling system and meat refrigeration case, which was installed as laid out on the agreement slip. A few days later, the customer, who had purchased a 16-foot box, called in inquiring where his 30 inch compressor compartment was, or why it had not been delivered. He complained that even if the compartment was not on the agreement slip (the contract called for basement compressor installation) that the salesman had promised him the compartment as an extra feature, and had signed a slip making that promise. Mr. Weis asked the customer to bring it in—and it was found that the salesman *had* signed such a slip. The 30-inch compressor compartment was delivered the next day, without a word to the salesman. When the latter received his check two weeks later, $30, the cost price of the compartment, had been deducted. Not many such instances have occurred since, because of the fact that salesmen soon get "wise" that such "free goods" costs themselves.

It Works on Used Equipment Too

The same idea holds true with used equipment—if the service man or salesmen gives too high an allowance on old equipment when he makes a sale of new merchandise, he runs the risk of finding it charged to himself. James men are thus making all "clean" deals, are well paid, and think twice on every sale.

Almost no repossessions is another advantage of the Customer Agreement, when every detail is clearly understood, the customer always holds to the line in payments and price. A final advantage is the "chart" on the back of the slip—which shows layouts of bars, stores, restaurants, etc., to help the salesman to engineer his own job.

New and Improved Appliances

Information contained in this department is furnished by the manufacturer of the article described and is not to be construed as the opinion of the Editor.

NEW TYPE OF COOLING COIL ANNOUNCED

A NEW type of cooling coil known as the Standard Polar Blower has just been announced by Standard Refrigeration Company, 20 N. Wacker Drive, Chicago.

In size, appearance, and adaptability to small spaces, it resembles a cold plate. In operation, however, it is more comparable to the wall-type unit cooler. It is constructed of sheet steel, formed into a narrow air duct or channel. Inside this duct is a bare pipe coil mechanically bonded to one side of the duct, or in the case of a coil two tubes or more high, the coil is bonded to both sides of the duct. A centrifugal blower fan attached to the bottom, side, or end, depending on application requirements, forces air around the coils and through the duct. The flow of air leaving the coil can be directed in as many as four or more directions.

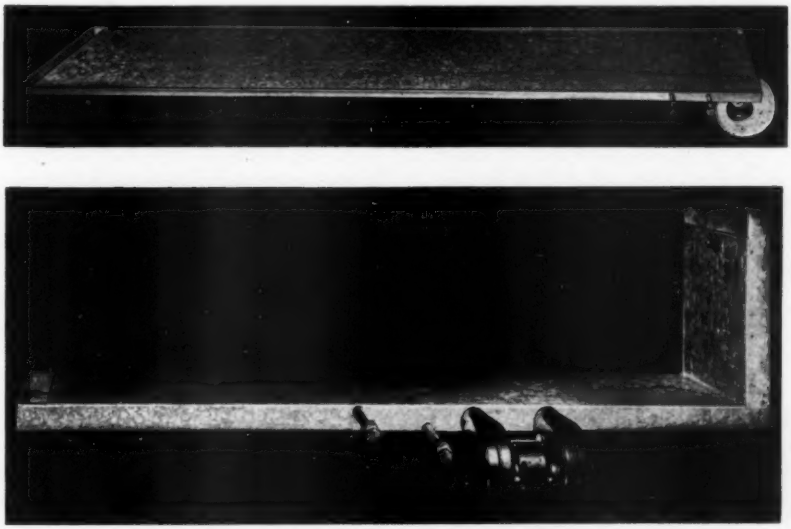
The Polar Blower is particularly adaptable to those applications where space is at a premium. With a thickness of ¾-inch, ⅞-inch, 1¼-inch and 2⅛-inch, it may be placed on walls, behind mullions, and in display cases underneath trays.

* * *

AMINCO SUREDRY DEHYDRATOR

CONTAINED in the new Aminco Suredry dehydrators manufactured by American Injector Co., Detroit, Mich., is a new type of filter which, it is claimed, provides greater filtering capacity with less pressure drop.

The new bronze filters are formed into discs or cones from microscopic circular granules of bronze, sintered to form a homogeneous mass that is at once porous and rigid. The depth of filtering area is a labyrinth for trapping foreign material without loss of refrigerant pressure.



Two styles of Polar Blowers. The bottom one is designed for display cases and is installed under the shelves.

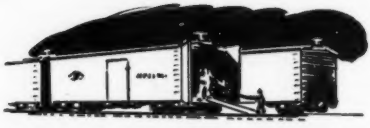
Why fedders has stuck to ALL-COPPER refrigeration SURFACE

45 YEARS OF FIELD EXPERIENCE WITH COPPER

Fedders 45 years of continual development and progress in heat transfer products has been closely tied up with COPPER. Consistent use of this commercially precious metal for so many years has given Fedders a background of experience and knowledge that is unequalled in the commercial refrigeration field. That is why Service Engineers who have standardized on Fedders know these products sell easier and stay sold.

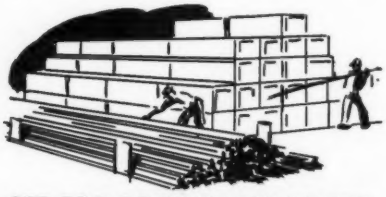
IT COSTS NO MORE TO GIVE YOUR CUSTOMERS THE BEST... COPPER

Your own Engineer's handbooks are the authorities for the **FACT** that **COPPER** is the most efficient heat transfer metal. Fedders has always stuck to **COPPER FINS** and **COPPER TUBES** because it is the best and costs less in the long run.



HUGE PRODUCTION SCHEDULES PERMIT FEDDERS PURCHASES IN CARLOADS

Fedders production figures run into the millions—both in units and dollars. In addition to being a leader in the manufacture of commercial refrigeration products, Fedders is the largest independent manufacturer of automotive radiators. Such large production schedules require purchases of copper in carloads and assure deliveries to you.



SET FOR PROMPT DELIVERIES

Large COPPER commitments to feed two full size plants devoted to producing heat transfer products exclusively, assure prompt delivery. Today and tomorrow Fedders will have copper available to fill your orders for products that are your "bread and butter".

Substance	Temp. °F.	k
Copper (pure)	212	2664
Aluminum	212	1428
Brass (60-40)	212	828
Zinc	212	744
Tin	212	408
Steel (mild)	212	396
Cast Iron	212	336
Lead	212	237
German Silver	212	200
Ice	32	15
Sandstone	104	12
Dolomite	122	12

Drawing below shows the ratio of heat transfer of various metals. Note the ice is completely removed by heat from the copper rod. This is undeniable laboratory proof that COPPER is tops for refrigeration surface.

FIELD AND LABORATORY TESTS PROVE COPPER MOST EFFICIENT COMMERCIAL METAL

By every test, COPPER is the fastest metal to transmit cold and heat and that, after all, is the primary job of refrigeration—taking heat out and putting cold in its place. The test, illustrated above, and the table from engineers' handbook proves how fast copper transmits heat in comparison to other metals. Yes, there are more reasons than one why you should play safe and buy FEDDERS There's a Fedders wholesaler in your city.

FEDDERS MANUFACTURING CO., BUFFALO, N. Y.

Atlanta, Boston, Chicago, Cincinnati, Dallas, Detroit, Los Angeles, New York, Philadelphia, St. Louis, Hamilton, Ont.

PURE TIN FINISH ON COPPER TUBES AND FINS

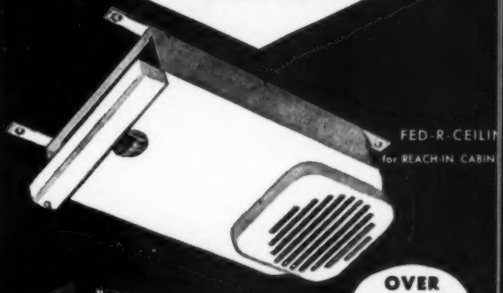
Another Fedders extra that keeps refrigeration surface performance at top efficiency and looks new. Play Safe . . . Specify and BUY FEDDERS.

FED-R-LUXE
for WALK-IN COOLERS
REACH-IN CABINETS
DISPLAY CASES

FED-R-INDIREC
for REACH-IN CABINE
DISPLAY CASES

Play Safe, Specify and **BUY**

fedders



FED-R-CEILI
for REACH-IN CABIN

OVER 100 UNIT COOLER MODELS

FED-R-FIN COILS
for WALK-IN COOLERS
REACH-IN CABINETS
DISPLAY CASES

FED-R-ZERO
for LOW TEMPERATURE
INSTALLATIONS

The travel of refrigerants through this filter is around the circular granules which deflect solid matter contained in the refrigerant stream and conduct the refrigerant through a maze not less than 3/32 inch in depth, all of which is available for filtering.

The dehydrator itself is a shell of one-piece copper construction, filled with Silica Gel. Connections are sweated into the shell, and the design is such as to remove all obstruction to the easy flow of refrigerant through it. The dehydrators are made in both refillable and non-rechargeable types.

POCKET SIZE TESTER FOR ELECTRICAL APPLIANCES

SERVICEMEN and salesmen of electrical appliances, as well as electrical contractors, will find special interest in an inexpensive, pocket-size appliance tester just introduced by Radio City Products Co., 88 Park Place, New York City, specialists in radio and electrical test equipment.

MODEL 417 TESTER.

The Model 417 appliance tester speeds up testing, trouble diagnosis and power-consumption demonstrations by elimination of the usual connection terminals. It is only necessary to plug the tester into the line and the appliance, in turn, into a receptacle provided on the face of the tester. Two 2-position toggle switches and a 3-position rotary switch then permit instant selection of the type of measurement and the meter range desired, with all measurements of voltage, current and power consumption provided by the multi-scale, AC/DC meter. Heavy duty terminals are provided for current values in excess of appliance ratings.

Eighteen measurement ranges are provided. These include AC and DC line voltage up to 250; four DC ampere ranges to 25 amps. and the same for AC; four DC watts ranges to 3000 watts and duplicate AC ranges.

Watt ranges are direct reading where the line supply is 120 volts and power factor of the appliance unity. Curves and data supplied with the instrument permit rapid conversion for different values of voltage and power factor. The Model 417 permits direct comparison of power consumed by various appliances.

This is also an excellent instrument for making power measurements of motors up to several horsepower.

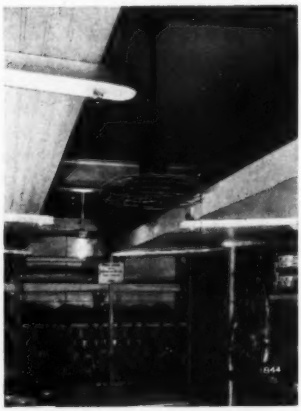
Contained in a neat hardwood case with etched metal panel, the overall dimensions of this instrument are 5⅞ inches long, 3¼ inches wide and 2 inches deep.

RECO CIRCULATOR

A NEW source of profit and a chance to greatly improve conditions in old "walk-in" refrigerators is offered Refrigeration Service Engineers by the new Reco Refrigerator Circulating Fan.

This circulator is made with 20 and 24 inch propellers, and is frequently installed in the ceiling of the refrigerator when floor space is limited.

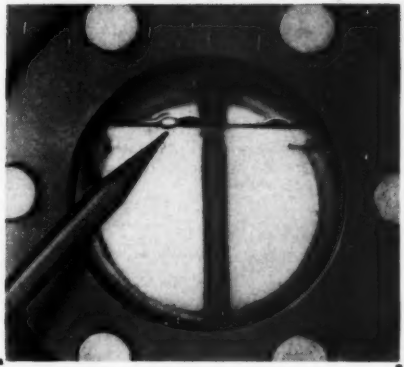
Improved conditions are obtained by providing complete and uniform circulation of air within the room.



CIRCULATOR AS INSTALLED.

The Safe, Low-cost way to Avoid •
FREEZEUPS — CORROSION — COPPER-PLATING — SLUDGE

PREVENT MOISTURE by using THAWZONE!



Above photo is from our new color movie film "The Story of Thawzone," now available for chapter meetings.

ECONOMICAL

It costs only 10c to protect 1 lb. of refrigerant with Thawzone.

GETS THE "HARD-TO-GET" WATER!

Water frequently is trapped in the receiver and floats on top of the refrigerant, remaining there indefinitely. It hydrolyzes the refrigerant, forming acids and causing corrosion throughout the system.

Any dehydrating method that waits for the water to be brought to it will be ineffective in eliminating water trapped as shown. But liquid THAWZONE constantly circulates through the entire system, searches out water *wherever* it may be and chemically destroys it and prevents corrosion, without harm to refrigerant, oil or parts.

HIGHSIDE CHEMICALS CO.
NEWARK, N. J.

THAWZONE
Fully Protected by U. S. Patents
The **PIONEER FLUID DEHYDRANT**

• Put Thawzone into every new, rebuilt or repaired unit before starting up. You can secure Thawzone from your favorite jobber.

CAUTION. Buy Thawzone only in its original packages. Look for the Blue, Black and White label.

Here are some of the difficulties that may be remedied by the Reco Circulator:

Frost and ice on the coils prevented.

Moisture on floor, walls and ceilings eliminated.

Disagreeable, musty or foul odors dissipated.

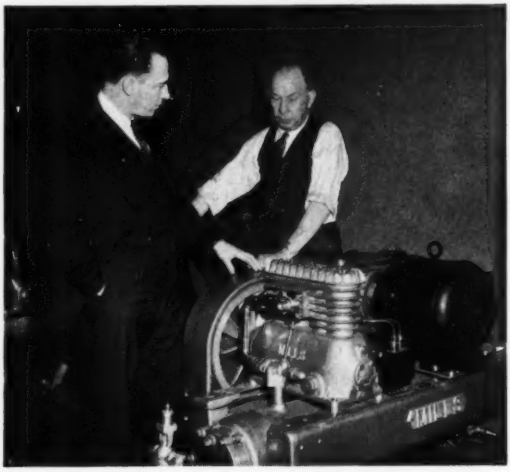
Evaporation of products retarded.

Refrigeration costs reduced.

The Reco operates on a new principle, which has proven scientifically and practically correct. It drives the air to the ceiling in opposition to the natural downward or gravity flow. As a result, it causes a turbulence of the air which sends it whirling in all directions and moving in all parts of the room, and around commodities. There are no "dead air" spaces.

This new circulator is manufactured by the Reynolds Electric Company, 2674 W. Congress Street, Chicago, Ill. Write them for complete information.

MILLS NEW 10 H.P. UNIT



The Mills new 10-h.p. condensing unit (FK9WH) here makes its bow to the public; looking on, are F. E. Jernberg, Sales Manager Commercial Refrigeration Division, and A. Ramclow, Chief Designing Engineer of the Refrigeration Experimental and Engineering Department, Mills Novelty Company.

This new unit is Mills' answer to the demand for a unit of this capacity for air-conditioning application.

This K9 four cylinder compressor has been developed explicitly for this class of installation. It is modern in design, and is the heavy duty vertical, single acting, reciprocating type. It possesses all the high quality features of the standard Mills line of condensing units, being precision built in one of the most modern equipped compressor plants in the industry.

Among the special features are the exclusive Mills design of crank case seal, incorporating the latest type sealing materials and enduring friction surfaces. Of particular interest, too, is the unique design of the intake and discharge valves. The shell and tube condenser receiver has abundant cooling surface, thereby eliminating the fins on the water tube; removable heads are furnished to facilitate cleaning.

Measuring 60 inches wide by 30 inches deep by 34 inches high, the unit is water cooled and uses Freon (F-12) refrigerant. The net weight is 1050 pounds—the rated capacity is 120,000 B.t.u. per hour at 40° F. suction temperature.

The unit is well balanced, streamlined and beautifully finished in gun-metal enamel.

QUESTION BOX

(Continued from page 26)

valve, after which the case did not get cool enough, and since meat was kept in the case, the temperature was required to be below 40 degrees. The fin coil does not frost completely, especially on the return bends, and to overcome this condition, I added some gas, even though the sight gauge showed that there was sufficient in the receiver. I also tried adjusting the expansion valve, but this did not improve the situation.

I would like to have your suggestions as to the trouble and how I can get this coil to work properly.

I might add that in replacing the expansion valve I used the same type and size of valve as the original equipment. The suction line frosts where it leaves the evaporator, which would seem to indicate that there is a proper distribution of refrigerant through the coil.

ANSWER: I can't see that there is anything wrong with this system, apart from the necessity of reducing the temperature in the fixture. Apparently, the refrigerant temperatures are not being maintained at a low enough level, and it is therefore necessary to reduce the setting of the pressure-switch until these temperatures are obtained. It may or may not be necessary to readjust the expansion valve after this is done.

This point can be more readily determined after the unit has been in operation under the new pressure settings for several hours. If the expansion valve needs adjusting, the suction line will be frosting for some distance away from the evaporator,

which will indicate that the expansion valve should be closed slightly until the frost line returns to within six inches or so of the evaporator. It is a fact that these valves are adjusted at the factory and ordinarily should not be readjusted. However, there are a few cases where the temperature of the evaporator is such that the valve must be adjusted to its requirements.

SMOKED HAMS GATHER MOLD

Question 439: I have a problem and am seeking an answer. In a "ham room" in a packing house, mold forms on the hams in from seven to fifteen days. These hams are smoked, treated, and then chilled before storing in the ham room. The temperature is kept at 50 degrees F. and the relative humidity is kept at or above 60 per cent, usually from 68 to 70 per cent.

The room is equipped with 675 feet of coil two inches in diameter for cooling and dehumidifying the air, together with a blower and duct system for air circulation. Ammonia is the refrigerant used. When heat is necessary, it is supplied by a motor-operated steam valve provided for that purpose.

The regulation seems to be good. What is wrong? Is the humidity too high? How may the humidity be reduced at this temperature?

Answer: Seventy per cent relative humidity does not sound too high to me for the storage of cured meats. However, there might be some conditions within this refrigerator, or conditions due to the hams themselves, that make it necessary to reduce this humidity.

Ordinarily, mold on meats is preceded by a noticeable sweating condition of the meat; or in other words, the surface of the meat has a slimy appearance, and has a decided amount of moisture collecting on it.

There are usually two causes for this condition: The first is that the humidity is too high, and the second is that there is improper air circulation over the products. Very often, even though forced circulation is used in the cooling unit, there are certain places within the cooler where very little or no circulation is felt. This sometimes is caused by the manner in which the meats are packed in the cooler, or in the manner of baffling or controlling the air currents.

I am not prepared to say definitely which of the above is the cause of your trouble, but perhaps these suggestions may give you a lead to the trouble.

To reduce the humidity, it may be necessary to do one or both of two things: First, to increase the air circulation, and if a fan is used in creating this circulation, it may be necessary to speed up the fan or change the direction of air currents in such a way as to strike the dead corners and create a greater drying effect on the products.

The other method is to cut out a part of the evaporator coil so that a lower refrigerant temperature will have to be maintained in order to maintain the proper refrigerator temperature. In other words, by increasing the difference in temperature between the refrigerant and the air within the refrigerated space, you will cause more moisture to be condensed on the refrigerating coil, thus reducing the humidity within the refrigerated space.

This last method should not be used unless absolutely necessary, because it has the bad feature of increasing the power requirements of the unit in order to provide the same amount of refrigeration. Reducing the suction pressure to the compressor reduces the overall output of the compressing unit.

S S S

EDUCATIONAL COLOR FILM

THE Highside Chemicals Company has just released a new movie film in color, "The Story of Thawzone," which will be booked for showing at the chapter meetings of the R. S. E. S. and at other gatherings in the refrigeration trade throughout the country.

There are many interesting scenes with explanatory titles. One in particular being a close-up of a special receiver in a typical refrigeration unit in which water has become trapped. The drops of water are seen clearly through the glass ends of the receiver, floating on the refrigerant and avoiding removal by conventional means, even though the system is in full circulation. This scene is employed by the manufacturer to illustrate its claim that Thawzone, miscible in refrigerant-oil mixtures, is valuable because it "hunts down" water rather than waits for the water to be brought to it.

The film will be booked and shown by the Virginia Smelting Company which has distributed Thawzone through its jobber outlets for the past few years.

MEMO TO SERVICE MEN!

● Every once in a while, some sensational improvement comes along that means an important saving of time and money in service operations, and also does a better job. We're sure that when you investigate the new and exclusive Frigidaire Modulex Expansion Valve you'll find it's one of the most outstanding of such improvements in some time.

Service Sales Department
Frigidaire Division, General Motors Sales Corporation
Dayton, Ohio

Sensationally New

FRIGIDAIRE Precision-Built MODULEX VALVE

Four Reasons why no other expansion valve matches it!

1 May be installed in any place—in any position! Hermetically sealed from all moisture. Solves installation difficulties of ordinary expansion valves. Saves time on every installation!

2 Reduces Suction Pressure Surging! This valve gets its name, "Modulex," from this advantage—from its modulating control of the refrigerant. Because this valve tends to keep the evaporator filled with refrigerant, it increases the efficiency of the evaporator and more even temperatures can be maintained.

3 Lowest Price in Frigidaire history! All the advantages you've been looking for in refrigerant control—and all at an amazing low price, the lowest in Frigidaire history for a comparable valve! Don't fail to investigate for your installations.

4 Small—Vest Pocket Size! From top to bottom it's only 3⅛". Greatest width at any point is only 3 1/16"—and it's only 1⅜" thick. Carry it in your vest pocket if you want to. Overall weight only 14 ounces!

● Now, when you install an expansion valve you don't have to work with a clumsy, expensive, hard-to-handle valve that must be placed in just the right position to provide even satisfactory refrigerant control. No. You simply install Frigidaire's new low-cost, vest pocket size Modulex Valve, *wherever it's most convenient!* And don't worry about its operation.

This new valve is built with the same precision and quality workmanship as the world-famous Frigidaire refrigerator. It's backed by years of Frigidaire and General Motors engineering experience. It's stood the test of time and use in over 2500 installations!

Investigate this sensational new Frigidaire Precision-Built Valve, now! See how much better service you can give your customers, how much time and money you can save with its amazing improvements and low price. Contact your Frigidaire Distributor at once. Mail coupon on next page, today, for *free* descriptive booklet with full details, including prices.

FROZEN IN A BLOCK OF ICE!

The ONLY vapor-charged Valve which is not affected, in operation, by surrounding temperatures. May be installed in any place, in any position!

Contact YOUR Frigidaire Distributor!

Ohio Edison Co., *Akron, Ohio*
Colonie & Montgomery Sts., *Albany, N. Y.*
675 Greenwood Ave., *Atlanta, Ga.*
Pratt St. & Market Pl., *Baltimore, Md.*
420 N. Broadway, *Billings, Mont.*
600 N. Seventh St., *Birmingham, Ala.*
23-25 Blandford St., *Boston, Mass.*
1100 Main St., *Buffalo, N. Y.*
Merchandise Mart, *Chicago, Ill.*
1729 E. 22nd St., *Cleveland, Ohio*
P. O. Box 1052, *Dayton, Ohio*
1920 Market St., *Denver, Colo.*
824 Mulberry St., *Des Moines, Iowa*
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500 San Francisco St., *El Paso, Texas*
2615 W. 7th St., *Fort Worth, Texas*
55 E. Washington St., *Hagerstown, Md.*
3104 Main St., *Houston, Texas*
927-31 N. Meridian St., *Indianapolis, Ind.*
212 Michigan Ave. West, *Jackson, Mich.*
2619 McGee Trafficway, *Kansas City, Mo.*
1057 North LaBrea Ave., *Los Angeles, Calif.*
831 E. Broadway, *Louisville, Ky.*
1071 Union Ave., *Memphis, Tenn.*
134 N. W. Third Ave., *Miami, Fla.*
647 West Virginia St., *Milwaukee, Wisc.*
4 Cummins Station, *Nashville, Tenn.*
19 E. Washington St., *New Castle, Pa.*
4436 Toulouse St., *New Orleans, La.*
P. O. Box 300, *Norfolk, Va.*
1250 53rd St., *Oakland, Calif.*
811-13 N. Broadway, *Oklahoma City, Okla.*
2558 Farnam St., *Omaha, Nebr.*
316 S. Jefferson Ave., *Peoria, Ill.*
1920-22 Chestnut St., *Philadelphia, Pa.*
404 Craig St., *Pittsburgh, Pa.*
1015 N. W. Glisan St., *Portland, Ore.*
29 Franklin Road, *Roanoke, Va.*
205 St. Paul St., *Rochester, N. Y.*
3414-28 Lindell Blvd., *St. Louis, Mo.*
2446 University Ave., *St. Paul, Minn.*
379 W. 2nd South St., *Salt Lake City, Utah*
301 S. Flores St., *San Antonio, Texas*
300 West Lake North, *Seattle, Wash.*
806 Pierce St., *Sioux City, Iowa*
320 Riverside St., *Spokane, Wash.*
351-57 E. Onondaga St., *Syracuse, N. Y.*
102 E. Lafayette St., *Tampa, Fla.*
146-48 N. Market St., *Wichita, Kansas*
(Also Toronto, Canada)

GENUINE FRIGIDAIRE PRECISION-BUILT PARTS

Free!

DESCRIPTIVE BOOKLET MAIL COUPON TODAY!

FRIGIDAIRE Service Parts Distributor

(Check list above for location of *your* Frigidaire Distributor)

Gentlemen: Please send me your Free Descriptive Booklet with full details, including prices, of the new Frigidaire Precision Built Modulex Expansion Valve. I understand there is no obligation.

Name .....

Firm .....

Street Address .....

City and State .....

New Peerless Plant in Operation at Marion, Ind.

PEERLESS OF AMERICA, Inc., has purchased a new production factory located in Marion, Indiana, consisting of over 200,000 square feet of floor space, and twelve buildings situated on nineteen acres of land, served by two Pennsylvania Railroad sidings.

According to M. W. Knight, Director of Publicity, eventually all of the Peerless factories now located in Los Angeles, Dallas, Long Island City and Chicago will be consolidated in this new factory. At the present time the Los Angeles and Dallas factories have already been moved to Marion, and a substantial portion of the manufacturing operations of the Chicago plant has been transferred. The Long Island City factory will be transferred complete at the end of the present refrigeration season.

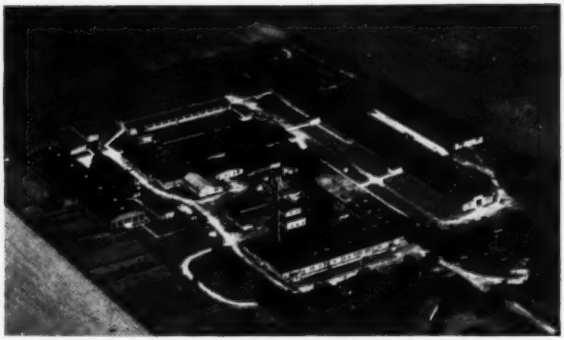
Complete sales offices and warehouses will be maintained in Chicago, New York, Los Angeles and Dallas so that customers will retain the same service they have had in the past from Peerless. This major move was necessitated by the tremendous increase in business over the last several years, and this final move is made to provide sufficient space for the proper expansion of the entire Peerless business for the next ten years.

When Peerless factories were first established around the country, commercial refrigeration products had not been standardized, and it was necessary to use local factories to provide different sections of the country with overnight coil service. The last three years have seen a definite standardization of products, notably, Unit Coolers, Dome Coolers, Gun Coolers, etc., so that it is now possible to manufacture the complete Peerless line in a central factory, and provide fast service for the different sections of the country by means of warehouses of finished merchandise. Through consolidation of all manufacturing facilities, quantity production is secured on all Peerless products, with resultant increased efficiency in both manufacturing cost and quality.

Peerless of America, Inc., was founded in 1912. For a number of years they manufactured compressors and other highside equipment. This entire line was discontinued in 1930, and the present line of Peerless products was initiated. Automatic fin coil machinery was designed and built to produce a new type of fin coil, permitting same day delivery of the product.

In September, 1934, the New York factory was opened, and equipped with this new special type of fin coil equipment. In 1937 the Los Angeles factory was opened, and in March of 1938 the Dallas factory was put in operation.

In 1938 Peerless developed the Thermek surface, which has had wide acceptance both in this country and abroad, and is now being used exclusively in all Peerless blower units, air conditioning coils, heat exchangers, etc. The development of Thermek has



Above: The spacious office building of the new plant. Below: An aerial view of the 17-acre plant recently purchased by Peerless

Sized for service men's convenience

Ansul cylinders of Sulphur Dioxide and Methyl Chloride come in several sizes, but there are three that are especially useful to the service man. These are big enough to contain sufficient quantities of gas, yet small enough to be carried easily in a service truck.

THE ANSUL JOBBER NEAR YOU CAN SUPPLY THESE HANDY-SIZED CYLINDERS AT YOUR CONVENIENCE

SO_2	25 lbs.	70 lbs.	100 lbs.
CH_3Cl	15 lbs.	40 lbs.	60 lbs.

ANSUL

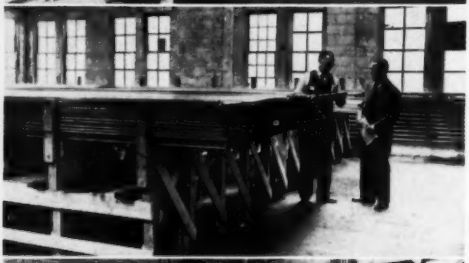
SULPHUR DIOXIDE
METHYL CHLORIDE

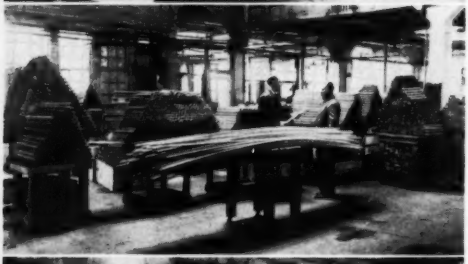
Agents for Kinetic's "Freon-12"

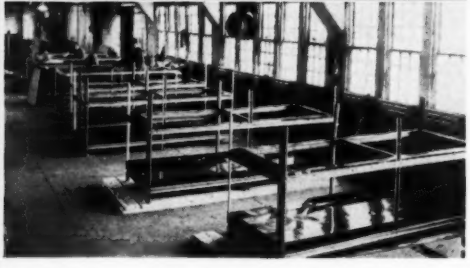
ANSUL CHEMICAL COMPANY • MARINETTE, WISCONSIN

LET THE ANSUL JOBBER NEAR YOU SERVE YOU BETTER

RS-28







changed the complete picture of the manufacture of coils to packaged merchandise whereby a stock of unit coolers, gun coolers, etc., can be carried by the jobber in warehouses throughout the country, giving prompt service to all trade factors.

It was necessary to start consolidation activities with all of these factories at a time when the backlog of business was at its highest point in ten years. At the same time shortage of essential defense material has developed to a large extent in Peerless products, which made it necessary for the Peerless engineering department to work night and day to re-design units, eliminating the use of such material which is not procurable.

Peerless was particularly hard hit by the aluminum embargo at one stage. However, the Engineering Department rose to the occasion, and substitute materials are now in use in every product. It has been found in a good many cases that the new designs and new materials are proving superior to the old. During this period Peerless deliveries have slowed down to a certain extent, but with the opening of new and increased facilities in Marion, the backlog of orders is rapidly being absorbed.

Key men from various factories around the country have been moved to Marion, and over five hundred employees will be engaged during the season. This new plant has facilities for over three thousand employees, when fully occupied.

E. Bockmeyer will headquarter in the New York sales office, directing Eastern operations. A. H. Witt will operate in the same capacity in Los Angeles, and H. E. Wickham will be in Dallas.

M. W. Knight will headquarter in Chicago, as Director of Publicity, and will handle sales in the Midwest Territory as well as direct National Account Activities. R. C. Follett, who recently joined the Peerless organization, will direct sales activities as Sales Manager from Marion.

Views of Plant, reading from top to bottom: A small section of the production line on expansion valves for which girls are being used for assembling. Pictured are M. W. Knight, Director of Publicity, at the left; L. J. Pitcher, Sales Manager of Expansion Valves; and at the extreme far right, Elmer Lederer, Manager of the Valve Dept.

Part of the stock room, showing the copper tube used in the manufacture of Thermek. At the left is R. W. Larson, Assistant Production Manager of the Marion plant, and Mr. Roy Follett, Sales Manager, Marion office.

Section of the plant showing stacks of Thermek Tubing which has been run off the machine, ready for fabrication into coils. M. W. Knight, left, and R. C. Follett.

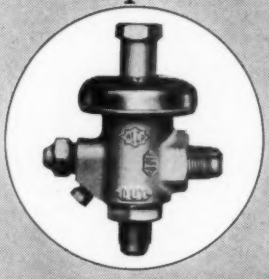
Small section of Unit Cooler production line. This line is 200 feet long. The gentleman wearing a hat is President R. W. Kritzer, who is actively engaged in getting the plant in running condition.

A small portion of the Cannon Cooler production line. Over eighty units were going through production at the time this photo was taken. David Snow, head of the Engineering Application Dept., is shown.

Announcing the New

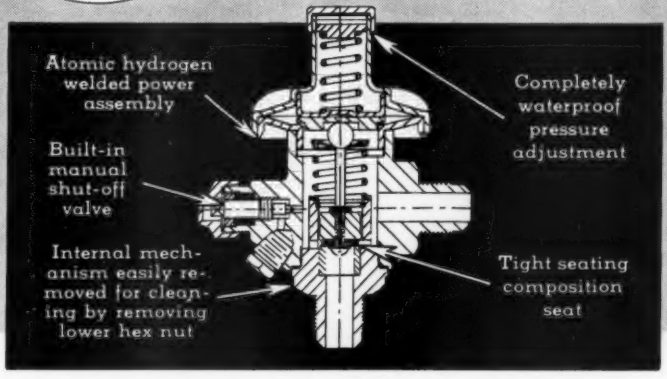
ALCO EVAPOTROL

Small Capacity Evaporator Pressure Regulator



With the Evapotrol, Alco now makes available the advantages of the exacting and rapid performance of Alco's Evaporator Pressure Regulators in a small size, small capacity valve.

The Evapotrol accurately maintains evaporator pressures regardless of sudden load changes or fluctuations in suction pressure. It is compact in design, light in weight and simple in construction, and only Alco offers all the following advantages:


Atomic hydrogen welded power assembly
Built-in manual shut-off valve
Internal mechanism easily removed for cleaning by removing lower hex nut
Completely waterproof pressure adjustment
Tight seating composition seat

In addition, the Evapotrol is highly sensitive in operation, maintaining evaporator pressures within the closest limits. It offers a valuable aid to the efficiency and close control of any installation.

For full information see your Alco jobber or write direct to Alco today.

ALCO VALVE COMPANY

2630 Big Bend Blvd. St. Louis, Missouri

New York • Chicago • San Francisco • Los Angeles • Seattle

Engineered Refrigerant Controls

THE STANDARD OF THE INDUSTRY

Three Southeastern Shows Attract Good Attendance

A SERIES of three refrigeration parts equipment shows promoted by E. V. Dunbar and J. E. Parker, and sponsored by jobbers in Atlanta, Ga., Montgomery and Birmingham, Ala., proved so successful that plans are now being made to enlarge the shows next year.

E. V. Dunbar is Southeastern Representative for Ranco, Inc., Virginia Smelting Company, and Wolverine Tube Company; J. E. Parker represents Automatic Products Company, Kold-Hold Manufacturing Company, Day and Night Water Cooler Company, Bush Manufacturing Company, and Chicago-Wilcox Manufacturing Company. Other manufacturers, other than those represented by the two promoters, were invited to participate in the program and display.

ATLANTA MEETING

The first show of the series was held March 3 in the Imperial Hotel, Atlanta, Ga. It was under the sponsorship of Bowen Refrigeration Supplies and Leo S. Bosarge Company. The program started at 1:30 p.m. and closed at 6:00 p.m. E. V. Dunbar acted as chairman of the meeting, welcoming the men to the Georgia Refrigeration Show, then continued with a talk on the history of dehydrating tubing, as originated by the Wolverine Tube Company of Detroit.

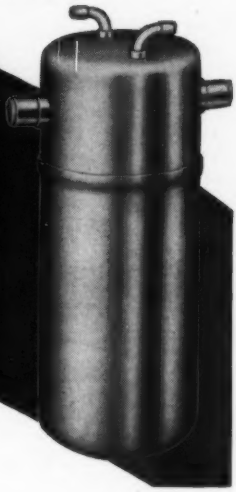
Continuing the program, L. C. Mitchum, Lubrication Engineer of the Texas Oil Company, talked on Capella oil. Ray Luber, Field Engineer of the L. H. Gilmer Company, delivered a talk on belt design and the proper application of belts. P. O. Domke, Refrigeration Engineer of the Mueller Brass Company, presented a discussion on the subject of pressure drop in refrigeration systems. Howard Jones of Ranco, Inc., presented the Ranco two-temperature control and its various applications. He also explained the new 1941 line of Ranco commercial controls. J. E. Parker presented the complete line of valves manufactured by the Automatic Products Company. A. D. Barr discussed the many applications of Air-Maze filters. J. E. Parker concluded the afternoon's session with a combined talk on Bush Coils, Day and Night Water Coolers, and Kold-Hold Plates.

At 6:00 p.m. the meeting adjourned to the cocktail room until 7:30 p.m. The banquet then got under way with 127 men present. Immediately after the banquet, E. V. Dunbar, who acted as toastmaster, introduced all the factory men present, and then presented Robert Graves of Bowen Refrigeration Supplies and Leo S. Bosarge of the Leo S. Bosarge Company, sponsors and hosts of the meeting.

M. G. Ogden, past president of the local chapter of the R.S.E.S., followed these introductions with a talk on the aims and purposes of the Refrigeration Service Engineers Society. The entertainment following the talk by Mr. Ogden consisted of a color-film, presented by E. V. Dunbar, showing a trip through the Virginia Smelting Company plant at

TEMPRITE

ANNOUNCES THE NEW ACCUMULATOR-INTERCHANGER



THE TEMPRITE ACCUMULATOR-INTERCHANGER IS DIFFERENT!

- It starts to work instantly with the compressor and, therefore, protects against starting spill-over which takes place before the ordinary exchanger warms up.
- It carries on where the ordinary exchanger leaves off because it also absorbs the surges which usually pass on to the compressor.
- It has negligible suction pressure drop.
- It is the exclusive combination of Accumulator, Turbulator Tube and Heat Exchanger which makes this type of performance possible.
- Of Copper Hydrogen Furnace Weld throughout, the Accumulator-Interchanger is clean, leak-proof and sturdy and, of course, it has the traditional Temprite efficiency.

Offered in three sizes of 1½, 3 and 6 Ton Capacity, respectively. For details and specifications, write your jobber for Temprite Form J-28

or write

TEMPRITE PRODUCTS CORPORATION

Originators of Instantaneous TEMPRITE INSTANTANEOUS *Liquid Cooling Devices*

49 PIQUETTE AVE. DETROIT, MICHIGAN

West Norfolk. A second movie of the All-Industry Show held in Chicago in January was furnished through the courtesy of Herman Goldberg of Chicago.

The program for the day was complete at 9:30 p.m. The ballroom, however, remained open until midnight in order to give the attendance a further opportunity of viewing the merchandise on display and of contacting factory men present. Factory men who cooperated with the promoters and jobbers in making this meeting a success were as follows: W. W. Conard, Southeastern Representative, L. H. Gilmer Company; W. Rapp, Mueller Brass Company; Cliff Boyd, Southeastern Representative, Dole Manufacturing Co. and Henry Valve Company; Frank Ellis, Radiator Specialty Company; Tom Hart, Southeastern Representative, Detroit Lubricator Company; N. E. Jennison, Penn Electric Switch Company; Henry Gullatt, Ansul Chemical Company.

MONTGOMERY MEETING

The second meeting of the series was held in Montgomery, Ala., March 5, and was sponsored by the Teague Hardware Company. This was the third annual meeting of this type to be held in Montgomery by the Teague Hardware Company.

E. V. Dunbar again acted as chairman of the meeting and again presented his talk on dehydrated tubing. A. D. Barr, Howard Jones, and J. E. Parker repeated their talks of the first meeting. In addition, N. V. Nutting of the Gates Rubber Company presented an interesting merchandise talk. Harry Dawson, Mueller Brass Company, made a talk on the subject, "It Makes No Difference." The afternoon session was concluded with a quiz contest of twenty questions, held to determine the winners of the door prizes.

A cocktail party, held from 6:30 p.m. to 7:30 p.m., preceded the banquet, which was served in the dining room of the Gay-Teague Hotel. Eighty-two men were in attendance at the meeting. Herman Goldberg's movie of the All-Industry Air Conditioning and Refrigeration Show in Chicago in January was again shown following the banquet, and the rest of the evening was spent in viewing the merchandise on display.

BIRMINGHAM MEETING

The Birmingham meeting was held March 7 at the Hotel Bankhead. It was sponsored by the Auto Service Company and Refrigeration Supplies Distributors. E. V. Dunbar acted as chairman and again repeated his talk of the two previous meetings. E. V. Nutting of the Gates Rubber Company, Howard Jones of Ranco, Inc., J. E. Parker of Automatic Products Company, Harry Dawson of the Mueller Brass Company, and A. D. Barr of Air-Maze Corporation repeated their talks of previous meetings. Others on the program were W. H. Mandy of the Texas Oil Company, who talked on Capella oils, and W. W. Conard of the Gilmer Belt Company, who talked on belt design and the proper application of belts.

The banquet following the meeting was attended by 97 men and was held in the Hotel Bankhead. After the banquet, E. V. Dunbar again presented the Virginia Smelting Company film, and Herman Goldberg's film of the All-Industry Show in Chicago wound up the entertainment.

During the rest of the evening a general round-table discussion was held in the form of an "Information Please," which proved to be most informative and pleasing.

CENTRAL INDIANA CHAPTER HOLDS INTERESTING MEETING

PLANS which had been in the making for several months were successfully concluded with the R.S.E.S. get-together party arranged by Central Indiana Chapter on April 30 in the attractive dining room and auditorium of the Indiana General Service Club Rooms. The ladies of the chapter had prepared the dinner for the members and their invited guests, and because of the large crowd, the dinner was served continuously from 7:00 until 8:30 P. M.

At the conclusion of the dinner, Mr. William Sevy, President of Central Indiana Chapter, called the meeting to order and introduced Mr. Vern Nold, Secretary, who had arranged for this evening's program and entertainment. All were appreciative of the work which Mr. Nold had done.

In proceeding with the educational program, the chairman called upon National Secretary, H. T. McDermott, who made a brief address on the work of the National Society. Following this, Mr. K. W. Cash, Penn Electric Switch Company, Goshen, Indiana, gave an interesting discussion on the application and servicing of the complete line of Penn controls and water valves.

One of the highlights of the program was the skit arranged by Mr. Nold entitled, "A Lady Service Man." It was cleverly done and provided a brief insight for the audience into some of the home life of an average service man.

Concluding the program for the evening was an illustrated talk on the application and servicing of Temprite equipment, by Mr. G. Jennings of the Detroit office.

To provide additional information for the members who attended this meeting from all points in Indiana, small displays were set up adjacent to the meeting hall, which included the products of the following concerns: Penn Electric Switch Company, Minneapolis-Honeywell Regulator Company, Detroit Valve Company, and Temprite products Company.

DO YOU MEAN ME?

ARE you an active member, the kind that would be missed,
Or are you just contented that your name is on the list?
Do you attend the meetings, and mingle with the flock,
Or do you stay at home and criticize and knock?

Do you take an active part to help the work along,
Or are you satisfied to be the kind that "just belong?"
Do you ever go to visit a member that is sick?
Or leave the work to just a few and talk about the "clique?"

Virginia STRINGS A SWELL LINE of low-pressure refrigerants

And that's not all you will find at your Virginia jobber's. You find, too, a rapid delivery service on orders of any size, any time—an efficient, time-saving method of handling empties and transfers. Be sure to have him show you the Virginia catalog of technical booklets and reprints; he can get them for you free.

Your Virginia jobber is a good business partner. He knows his success depends on how well he backs you up.

BUY YOUR KINETIC'S FREON-12* via VIRGINIA
*Reg. U. S. Pat. Off.

EXTRA DRY ESOTOO · Methylene Chloride · V-METH-L

VIRGINIA SMELTING CO.

Located at tidewater
WEST NORFOLK, VIRGINIA

V VIRGINIA

That "RECALIBRATOR" SCREW

— a SMALL thing to look for
. . . a BIG thing to find

THE "Recalibrator" screw on a Marsh Gauge identifies the kind of gauge that you can *keep* accurate. If it's knocked out of adjustment, just turn that screw until the pointer (with pressure or vacuum removed) rests at zero. The gauge will then be correct at all points on the scale—a *basic* correction that can not be made by ordinary "zero adjustments" or by the usual re-setting of the pointer.

This same "Recalibrator" is found in Marsh Dial Thermometers . . . just one of a long list of betterments that are combined only in Marsh Instruments.

JAS. P. MARSH CORPORATION
2059 Southport Ave., Chicago, Ill.

● In addition to standard instruments Marsh offers the "Serviceman", remote reading thermometer and group of handy small portable recorders—temperature recorders, pressure recorders and operating cycle recorders . . . sold at a remarkably moderate price. You will see these and other interesting instruments at the Marsh booth during the 1941 Refrigeration & Air Conditioning Exhibition.

MARSH *Refrigeration Instruments*

There's quite a program scheduled that
I'm sure you've heard about,
And we'll appreciate if you too, will come
and help us out.
So come to the meetings often, and help
with hand and heart.
Don't be just a member, but take an active
part.

Think this over, MEMBER, you know right
from wrong,
Are you an active member, or do you just
belong?

Contributed by Trenton Chapter.

HELP! HELP!

AN appeal to all officers and members of each chapter and members-at-large was recently issued by E. A. Summers, Chairman of the National Code and License Committee.

At the last convention, it was pointed out, the committee was appointed to study the codes and license arrangements of various cities. As it is impossible for the committee to contact each city, the membership in general is asked to help out with all information possible, not only from their own city, but also from any neighboring cities.

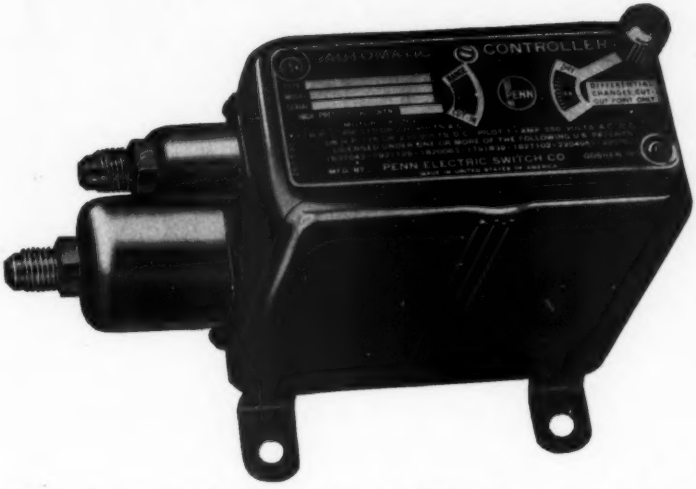
Address such information to E. A. Summers, Box 1782, Baton Rouge, La.

MASSACHUSETTS STATE ASSOCIATION MEETING

THE first Massachusetts State Association meeting was held in Worcester, April 16, 1941, with sixty present. Thomas Cronk, President of the Worcester Chapter welcomed the two guest chapters, Boston and Springfield, and then introduced H. T. McDermott, National Secretary, Lawrence Hall, President of Boston Chapter, Charles Adams, President of the Springfield Chapter, and Stuart Garland, President of the organizing committee, to whom he turned over the meeting.

Stuart B. Garland acknowledged the assistance of the organizing committee in making the State Association possible, and in-

Choose controls to fit the job – Calibrated or Standard



There is no such thing as the "best" control for all jobs!

Experienced refrigeration engineers know this. Some installations should be made with fixed cut-in and cut-out settings . . . with controls that do not invite the user to change these settings.

On other types of installations, it may be necessary or desirable to change settings frequently, *and with accuracy.*

Penn offers controls for both classes of applications. Newest addition to the complete Penn line is the 1260 Series low side pressure or temperature controls and the 1261 Series dual pressure or dual temperature controls incorporating accurately calibrated scales. These new controls incorporate the same service-proved magnet contact structure as the 260 and 261 Series controls. Dimensions and mounting specifications are the same as 260 and 261 Series controls, making them quickly interchangeable on any unit.

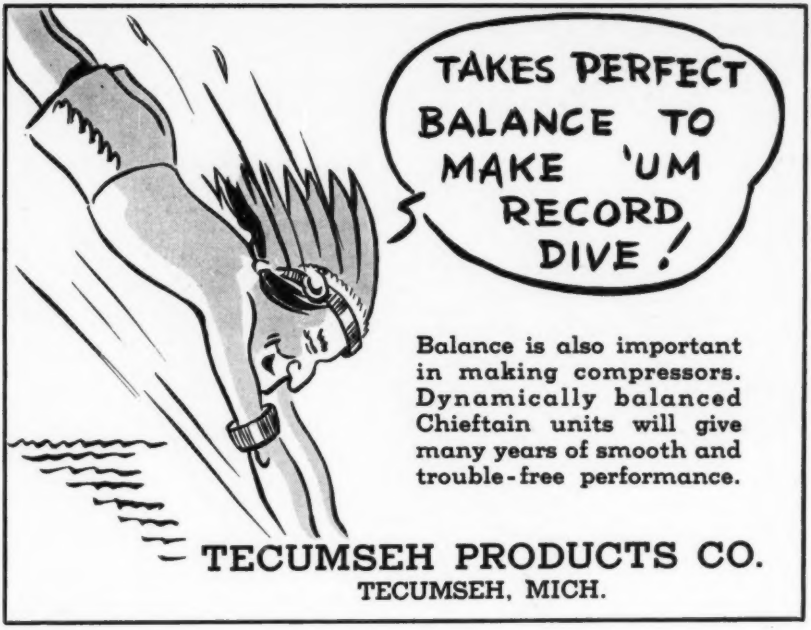
Calibrated 1260 and 1261 Series controls are available with calibrated scale on the cut-in point only, the differential only, or both. Also available with limited adjustment finger-tip knob, accurately calibrated, on either cut-in or differential adjuster, as specified.

If the installation is one that calls for controls which *do not* invite tampering with the settings, specify Penn 260 or 261 Series. But if quick, accurate adjustment and frequent changes in adjustment are required, specify Penn 1260 and 1261 Series. Write for information or contact the nearest Penn branch office, representative or distributor.

Penn Electric Switch Co., Goshen, Indiana. In Canada: Powerlite Devices, Ltd., Penn Electric Switch Division, Toronto, Ont. Export: 100 Varick St., New York City. Branches, representatives and distributors in principal cities.

PENN

Pick up Penn Controls from your Refrigeration Equipment Jobber


TAKES PERFECT BALANCE TO MAKE 'UM RECORD DIVE!
Balance is also important in making compressors. Dynamically balanced Chieftain units will give many years of smooth and trouble-free performance.
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troduced the members of that committee: Thomas Cronk, Charles Harris, H. C. Lambert, Pierce Goodney, and William Daisy.

Mr. Garland then proceeded with the business of the meeting, and it was voted to have each chapter elect two of its members to a nominating committee. A recess was called while this committee was appointed. Those selected were as follows: Boston, Edward Hoyt and Gerald Bradford; Worcester, William Venier and William Teriney; Springfield, William Quimby and A. Herbert. The names of the nominating committee were read and accepted by the association, and while this committee was making its selection of officers, Mr. Garland read messages.

The officers elected were: *President,* Stuart B. Garland, Worcester, Mass.; *1st Vice-President,* Charles C. E. Harris, Boston, Mass.; *2d Vice-President,* Harold C. Lambert, Springfield, Mass.; *Treasurer,* H. P. Goodney, Worcester, Mass.; *Secretary,* Charles A. Adams, Springfield, Mass.; *Sergeant-at-Arms,* Bertil Stenmark, Boston, Mass.; *Directors,* Thomas H. Cronk, Worcester, J. Lawrence Hall, Nashua, N. H., W. J. Plante, Springfield.

The constitution and by-laws were read and adopted separately by a vote, after which the business meeting was closed. After an enjoyable dinner Mr. McDermott introduced and inducted the new officers one by one. He then presented the State Association Charter.

A handsome door prize, an electric clock, presented by Robert W. Sheperdson, President of Standard Supply, Inc., Worcester, was won by M. F. Colbert of Worcester.

* * *

R. S. E. S. Chapter Notes

TRENTON CHAPTER

March 31—The meeting was called to order by President George Price and considerable time was spent in conducting chapter business. Reports were received on the progress being made with the banquet plans, and a discussion was held regarding the type of entertainment that should be provided.

On the educational program Harry Jaeger, Chairman of the committee, conducted a Take-it-or-Leave-it program. Winners were: Michael Wargo, Louis Laurio, Louis Gershenfeld, John Taros, Jack Nobinger, George Frie, Morris Marinelli, Sam Cohen, David Laurio, Franklyn Beemish, Al Schweizer, and Bill Funkhouser.

April 7—The second annual banquet of the chapter was held at the Club Condado. The banquet was an overwhelming success with seventy-four people attending. Harry Jaeger, Chairman of the Education Committee, acted as master of ceremonies. The officers of the past year were introduced and complimented on their excellent work during their terms of office. The new officers were then introduced and inducted into their respective offices.

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They are as follows: *President*, George Frie; *1st Vice-President*, H. Beemish; *2d Vice-President*, William Funkhouser; *Secretary*, Samuel Cohen; *Treasurer*, Al Schweitzer; *Sergeant-at-Arms*, Harry Teel.

Israel Kramer of the Kramer-Trenton Company gave a short talk pointing out the importance and responsibilities of the refrigeration service engineers. As a climax to the dinner, everyone was treated to a good laugh when Harry Klingler, President of the E.R.A. of Philadelphia, told a few unusual experiences he had had during his years in the refrigeration business.

Mr. Jaeger invited the ladies present to form a ladies' auxiliary, and followed the invitation with concrete suggestions. The evening was then turned over to the pleasures of music and dancing.

ROCKFORD CHAPTER

April 7—The meeting was called to order by the president with approximately twenty-five members present. The minutes of the previous meeting were read and approved and various reports were received from committees. A motion was made and duly carried that in appreciation of the secretary's efforts during the year his dues be paid by the chapter for the year during which he served in office. Various bills were passed for payment and checks were immediately drawn to cover them.

ST. LOUIS CHAPTER

March 13—After the business of the evening was completed, A. H. Huhn read a pamphlet entitled, "The Care and Handling of Meats," prepared by a large packing company for its meat retailers. Discussions from the floor were numerous regarding the construction of display cases, walk-in coolers, and other equipment used in retail markets.

March 27—E. A. Plesskott made the suggestion that the chapter provide for a telephone listing in the classified section of the telephone book, and suggested that the secretary get all the information available from the telephone company. A. H. Huhn delivered the second part of the paper entitled, "Proper Size Coils, Compressors, and the Correct Setting of Controls for Meat Coolers." Charts of various meat coolers pertaining to temperature, humidity, head pressure, suction pressure, and running time were passed among the members for inspection. Questions from the floor and their discussion occupied considerable time following the reading of the paper.

KANSAS CITY CHAPTER

February 25—A report on the dinner dance was given by the secretary, followed by a financial report by Berry Allen. A picture of the dinner dance was passed around, and the opinion was expressed that the chapter should purchase pictures and sell them for 50c each.

The subject of a certificate examination was discussed, and the suggestion was made that the chapter hold an open discussion on questions at the next meeting. This should be followed in the near future by the examination. The discussions then centered around the possible educational program for the coming year, the final decision being left to the educational committee, which, it was announced, would meet in the near future at the home of Jules P. DeWilde.

TWIN CITY CHAPTER

April 1—The meeting was held in the Hamline Hotel, and this meeting was particularly successful due to the fact that ten new members were accepted for membership. Mr. Ehlers reported for the committee in charge of price rates, and Mr. Schaeffer read the newly-devised code to the membership. The meeting was turned over to Mr. Ost, Educational Director, who conducted a Take-it-or-Leave-it program. Those participating in the program and the winners are as follows: Charles Mahlmann, Art

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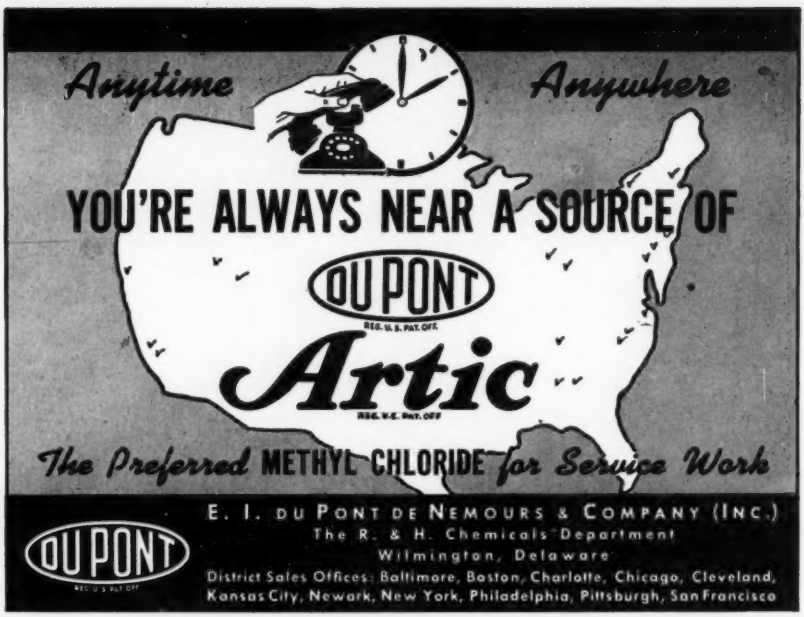
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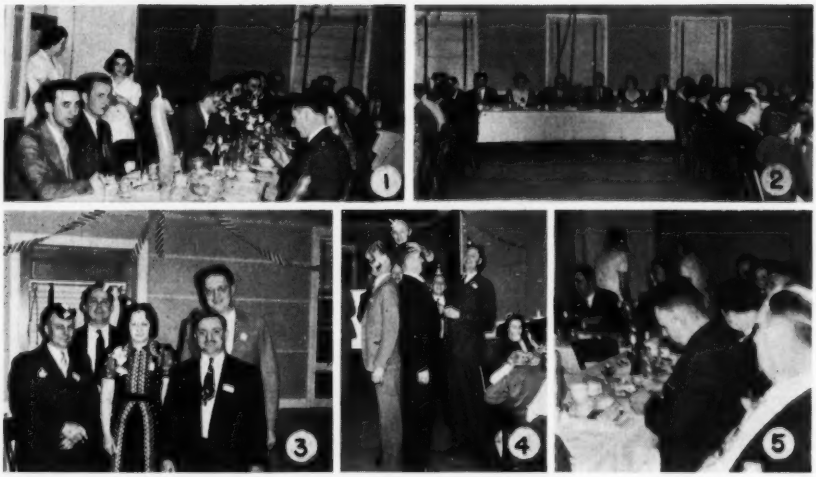

CENTRAL NEW YORK CHAPTER ANNUAL BANQUET

Despite a typical New York thunder storm, fifty-five members of the chapter and their wives and friends gathered at Aureli's in Liverpool, N. Y., April 19, for their annual banquet. After the dinner, entertainment was furnished by paid entertainers and a movie of the 1941 All-Industry Show in Chicago. The Ladies Auxiliary took charge of decorating the tables, and special credit is given Mrs. Weldon Andrews, President of the Auxiliary, and Mrs. Ivan Thorn for their efforts.

As a novelty for the evening Maurice Schwartzberg made recordings of the individual members' singing.

In the above pictures, Nos. 1, 2, and 3 show various groups seated at the banquet; No. 3 is the committee in charge of the banquet, and they are, reading left to right: President Fritz Harder; Secretary Henry Jenda, Mrs. Weldon Andrews, Maurice Schwartzberg, and Robert Wilson. No. 4 shows Carl Stewart judging the contest to find the tallest man, with Paul Cross getting a big laugh in the background.

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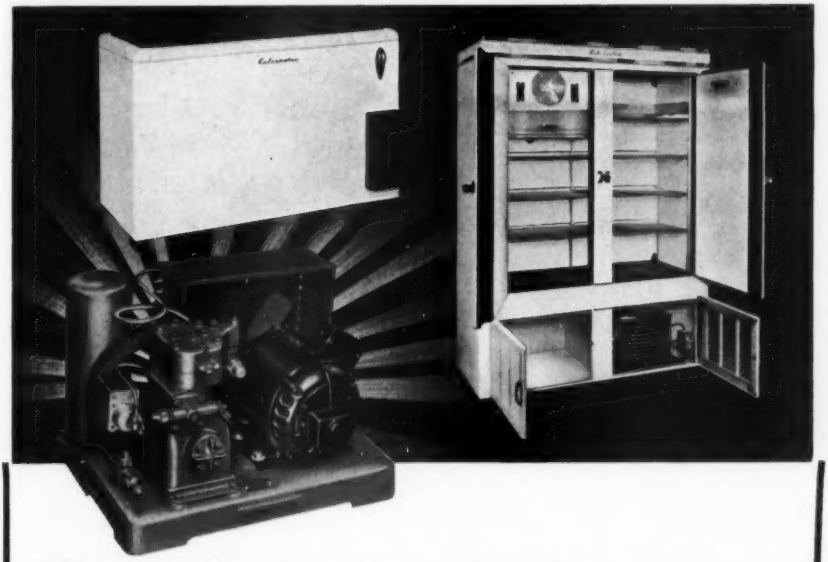

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Larsen, Jack Ehlers, Kenny Saldin, Gay Randall, H. J. Sundgaard, Argo Mattinson, Lee Miles, John Stewart, C. A. McCafferty, Merion Soma, Lars Berheim, Otto Chermak, Bob Fedderman, Harry Schaeffer.

April 15—After the meeting had been called to order, President Palen introduced Frank Pond of Refrigeration Industrial Supply, sponsors of the meeting. Mr. Pond thanked those present for the business they had given him and hoped every one would enjoy himself at the meeting. Mr. Pond then introduced Herman Goldberg and Tom Pluff as the "Ansul Twins," following which he turned the meeting over to C. A. McCafferty, master of ceremonies for the evening.

Carl Johnson of Peerless of America, Inc., was the first speaker introduced, and he gave a short talk on his products, pointing out the increasing difficulties the jobbers are having in filling orders. Mr. Page of Detroit Lubricator was next on the program, who introduced Willis Stafford of the same company. Mr. Stafford gave an interesting talk on his activities in the national organization of the Society, and further described the many benefits one may enjoy through membership in a chapter.

Herman Goldberg showed his films of the 1941 convention in Chicago. Refreshments were served after the meeting had been adjourned.

OIL CAPITAL CHAPTER

April 9—The meeting was called to order by the president, E. H. Churchwell. The purpose of the meeting was to elect officers for the year ending April, 1942. Previous to this closed meeting, an open meeting was held, sponsored by the Educational Committee. A very interesting program was arranged, including a demonstration of a refrigeration system in action by colored Neon glass tubing. This was put on by the Penn Electric Switch Company, and the demonstration was supplemented by a talk with pictures. There was a good attendance at this meeting.

K. G. Wight of the K & M Supply Company donated several refrigeration parts for door prizes.

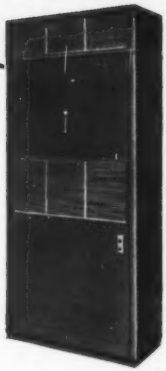
In the business meeting a motion was made and seconded that E. H. Churchwell be re-elected our president for the following year. The motion carried. Jim Fortune was nominated for vice-president and elected by popular vote. The office of secretary-treasurer, after a second vote by ballot, was given to Forrest E. Warehime of Sapulpa, Oklahoma.

SAN DIEGO CHAPTER

April 10—The evening was devoted to a banquet held in the Hartley House, one of San Diego's finer eating places. Tickets were sold in advance to all members, thus assuring a good attendance. Most of the credit for the large sale of tickets goes to the two leading refrigeration supply houses, namely, Refrigeration Supplies Distributors and Allied Refrigeration, both of which are boosters of the Society. After a fine steak dinner, a short business session was held, followed by DeWitt Clark, of Automatic Products Company, who occupied the rest of the evening with an interesting talk on expansion valves and refrigerant control devices. After the talk, Mr. Clark answered many questions on the subject and was kept busy for a considerable length of time.

NEW YORK CHAPTER

April 2—The only discussion of the evening came from Mr. Condon in regard to sending out cards to all of the better shops in the Metropolitan District, inviting them to attend the education meetings of the chapter. In answer to this suggestion the secretary produced a letter from T. A. Reina, President of the Air Conditioning Guild, Inc. Mr. Merenda read the letter, the essence of which was an invitation to get together and discuss the possibility of the two organizations holding joint meetings occasionally. The idea appealed to the membership in gen-



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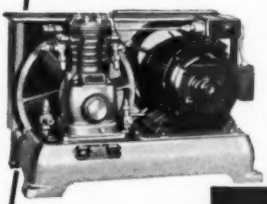

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eral, and it was suggested that the chapter cooperate with the Guild.

COLUMBUS CHAPTER

April 14—Considering the extremely warm weather at the time of the meeting, a very good attendance was enjoyed by the chapter. On the educational program, Mr. Clark of the Penn Electric Switch Company provided a very interesting demonstration and description of devices manufactured by his company.

SPRINGFIELD CHAPTER

March 12—The meeting was held in the home of R. M. Potter. The minutes were read and approved, and President Potter appointed a membership committee to act also as an investigating committee.

March 26—The meeting was held in the home of R. S. Dobbins, with a pot luck supper preceding the meeting. Thirty-eight members and guests were present. The business of the chapter was completed within a relatively short time, and a discussion on a place to hold the next meeting and how much should be spent for the fish supper resulted in deciding on Pasfield Park Pavilion as the place, and 35c as the charge per plate.

After the meeting had been adjourned, E. Earl Thomas entertained the group with movies he had taken during a trip through the West.

ILLINOIS VALLEY CHAPTER

March 28—The chapter was the guest of the Gale Products Company, where a very extensive educational program was supplied, and both the ladies and gentlemen enjoyed a buffet lunch after the meeting. John H. Sackey acted as master of ceremonies, and the first speaker to appear on the education program was S. A. Briggs of Outboard Marine and Manufacturing Company. His talk was followed by C. A. Thomson, who spoke on Gale household refrigerators. J. F. Furry outlined the engineering features of Gale Products; Gale Fluid-Cooled Static Condensers and Equalizers came in for a thorough explanation by Phil Sidell, and the Gale Mountain Air Conditioner was discussed by Fred Roper and Art Ames. Outlining the advertising program of the Gale organization, E. F. Malt-by pointed out the highlights of the entire program.

The meeting was held in the Jefferson Hotel in Peoria, and the Gale organization was aided in its program by a very splendid display of Gale refrigerators, room coolers, and cutaway views of the working parts of the system. In addition to those speakers already mentioned, others who assisted in putting on the program were: L. H. Baker, Sales Manager; J. E. Armes, Sales Department; E. S. Harris, Service Department; William Morgan, Sales Department; Pat Rebscher, Sales Department; George Lindgren, Engineering Department; C. A. Marvin, Sales Department.

A very delightful part of the evening, which proved a surprise to the visitors present, was the sudden unveiling of a large table spread with eats and refreshments, to which the ladies were invited to participate with the men. These refreshments topped off a very enjoyable educational evening, providing just the right social touch.

NIAGARA FRONTIER CHAPTER

March 13—On the educational program Fred Veidon, of Beals, McCarthy & Rogers, introduced George Franck, of the Imperial Brass Company, who gave an interesting talk on Torpedo Dehydrators. Mr. Penn, of Penn Electric Switch Company, was next on the program with a film and talk demonstrating the use of controls manufactured by his company.

Two door prizes were provided for the evening by W. A. Case and by Beals, McCarthy & Rogers. The first prize was won by Al Oberlander, and the second by Frank O'Hara. Refreshments, provided by the Imperial Brass Mfg. Co. and Penn Electric Switch Co., were served after the meeting.

April 2—A demonstration of the glass evaporator,

sponsored by the Alco Valve Company, was the feature of this meeting in the Como Restaurant. It was an open meeting, and many prospective members attended. President John K. Bush presided.

HUDSON MOHAWK CHAPTER

March 12—The meeting was devoted almost entirely to the election of officers, and after following the usual procedure of such elections, the results were: *President,* E. J. Walters, Schenectady, N. Y.; *1st Vice-President,* Joe Dayton, Schenectady; *2d Vice-President,* A. H. Coutant, Kingston, N. Y.; *Secretary,* William Andrews, Troy, N. Y.; *Treasurer,* George B. Gardner, Schenectady; *Sergeant-at-Arms,* James Gibbons, Scotia, N. Y.; *Directors,* E. C. Wilkinson, D. Roger Pitman, Ralph Feathers.

MISSISSIPPI VALLEY CHAPTER

March 4—The business of the chapter occupied the greater part of the evening, with discussions taking place on ways and means of increasing membership, and on future educational programs to be scheduled. A quiz contest is scheduled for the near future, and some discussion was held concerning prizes to be offered.

March 18—During the business session of the evening two committees were appointed by the president, first, the educational committee consisting of Frank Weatherly, W. Cawiezell, Fred Tindall, and G. H. Swails, and second, the entertainment committee consisting of Paul Winkler, George Lindfelt, and Robert Felts.

April 1—The entire evening was devoted to discussions and business matters of the chapter, no educational program having been scheduled.

MILE HIGH CHAPTER

February 12—An informal discussion took place on ways and means of building up the chapter. The suggestion was made, and after some discussion it was decided, to hold a combination dinner and tube bending contest in lieu of the next regular meeting. Members appointed as a committee to make complete arrangements were Messrs. McCombs, Martin, and Darby.

March 12—The evening was devoted entirely to social enjoyment to which the ladies were invited, together with the friends of the members. A dinner started off the evening, followed by a floor show, after which a tube bending contest was held. Dancing occupied the rest of the evening.

MOTOR CITY CHAPTER

February 25—The meeting was called to order by President E. Hanson and the minutes of the last meeting were read by Secretary C. Morgan. Consideration was given to places for the future meetings of the chapter, and Mr. Henderson reported that he had located a store building on Beecher Road for which there would be no rental charge, but which would have to be heated and lighted at the chapter's expense.

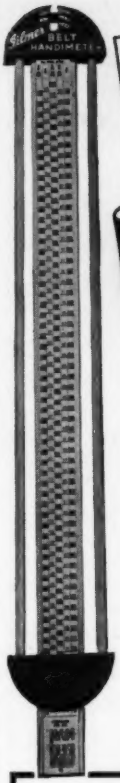
A Take-it-or-Leave-it contest was held during the educational session, and the prizes offered were 6-inch decalcomanias. The contest was won by H. Sharp, A. Williams, O. Chasteen, and O. Dobbs.

March 11—A questionnaire on flat rate service charges was filled in by each member for the purpose of determining what a fair rate should be. An average of these will be taken and the chapter will be informed so that every one may work on an equal basis.

On the educational program Mr. Penn of the Penn Electric Switch Company gave a demonstration of products manufactured by his company. This meeting was held in the Marine Room of the Flint Athletic Club.

March 25—The greater part of the evening was spent in discussing flat rates and hourly charges by the members of the chapter, with the endeavor to arrive at some uniform basis of charge among the membership. No educational program was planned.

April 8—Immediately after calling the meeting to order and after the minutes of the previous meeting



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had been read, a short discussion was held on the flat rate charges under study by the chapter.

The rest of the evening was spent in the election of officers, those elected to serve until June 30, 1942, being: *President*, Wilbur Henderson; *1st Vice-President*, Einer Hansen; *2d Vice-President*, Earl Stewart; *Secretary*, David Fortune; *Treasurer*, Clare Babcock; *Sergeant-at-Arms*, E. Chasteen.

PITTSBURGH CHAPTER

April 8—The meeting was held in the Fort Pitt Hotel with A. H. Ross presiding. After the business of the evening had been completed, the educational committee introduced W. Baggs, who demonstrated and explained a service test kit he had constructed. After this a contest was held with Larry Blose in charge. The contest was arranged in such a manner that when a question was asked, any one in attendance answering correctly was paid by the chapter the amount specified on the question; if the question was answered incorrectly, the contestant paid the specified amount to the chapter.

The meeting was adjourned in time for the members to witness the trial blackout in Pittsburgh that evening.

Ladies Auxiliary

KANSAS CITY AUXILIARY

March 11—The evening was devoted primarily to playing cards, Mrs. Hoover being the winner for the evening.

March 25—A business meeting was held following which the remainder of the evening was spent playing Bingo.

April 8—The meeting was called to order by Mrs. Cox, President, and the minutes of the last meeting were read and approved. Thanks to Mrs. Visger, a

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box of candy was enjoyed by those present throughout the evening. The men also enjoyed their share of the candy when they joined the ladies after their meeting. As a means of providing money for the auxiliary, fancy work, assorted cards, gift wrappings, and notions were sold during the evening.

TRI-STATE AUXILIARY

March 25—The meeting was held at the home of Mrs. Brunton. A pot luck supper was enjoyed by the members of the chapter and the auxiliary, after which the men departed to their meeting and the ladies called their meeting to order. Mrs. Brunton conducted several contests during the evening, and Bingo occupied considerable time.

April 8—The meeting was held at the home of Mrs. Gruber. A short business session was held and Mrs. Brunton gave a book report on Easter. Chinese checkers were played as the entertainment feature.

April 22—The Tri-State Chapter entertained the members of the Auxiliary at the Ventura Hotel with the annual fish fry.

COLUMBUS AUXILIARY

February 27—The meeting was called to order by the acting president, and an election of officers got under way. Those elected were: Mrs. Robert Creamer, *President;* Mrs. J. D. Merkle, *Vice-President;* Mrs. N. H. Tysinger, *2d Vice-President;* Mrs. L. H. Hulett, *Secretary;* Mrs. Merrill Brethauer, *Treasurer;* Mrs. David Little, *Sergeant-at-Arms.* The rest of the evening was spent in playing games, and lunch was furnished by the men's chapter.

March 13—The meeting was held at the Legion Post. Business was taken care of and all reports received, after which the evening was spent in playing games planned by Mrs. Little and Mrs. Brethauer. Mrs. Merkle was the winner of the prize.

March 27—After the business meeting was closed, the rest of the evening was spent in playing cards. Also, an interesting contest was arranged by Mrs. Creamer, with Mrs. Sayre winning the first prize.

ROCKFORD AUXILIARY

April 7—After some discussion it was decided that the annual election of officers would be held at the next meeting. After the business had been completed, the rest of the evening was devoted to playing Cootie, with Mrs. Sturch, Mrs. Henley, and Mrs. Overman winning the prizes.

MISSOURI VALLEY AUXILIARY

March 7—Since there was no business to be conducted at this meeting, the entire evening was devoted to Red Cross work.

ILLINOIS VALLEY AUXILIARY

March 28—The ladies met at the Jefferson Hotel, and the meeting was presided over by Mrs. Dresback. Considerable business was conducted during the evening, followed by a contest arranged by Mrs. Shinneman and Mrs. Tobias. Then the rest of the evening was spent in playing Bingo. Mrs. McGill, Mrs. Cline, and Mrs. Luckert were winners of the game.

The latter part of the evening the ladies were invited to join the men in a buffet supper served by the Gale Products Company of Galesburg, Illinois, who were entertaining the men at their meeting.

April 11—The meeting opened with the Pledge of Allegiance, after which Mrs. Loercher and Mrs. Dresback took charge of the entertainment for the evening. Pinochle was played with the prizes being awarded to Mrs. Luckert, Mrs. Sackey, and Mrs. McGill.

CENTRAL NEW YORK AUXILIARY

March 26—The meeting was held in the home of Mrs. Jenda, but was interrupted by the invitation

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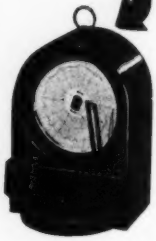

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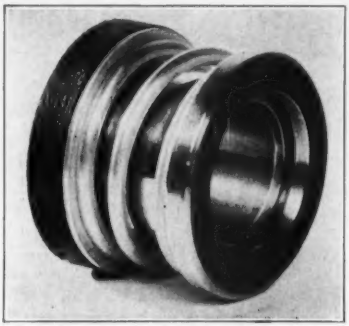

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